

National Hip Fracture Toolkit

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The Bone and Joint Decade
Promoting musculoskeletal health
Keep people moving



CDC
STRATEGY GROUP

Edited by:

Dr James Waddell, MD, FRCSC, Project Lead, Bone and Joint Canada

Authors:

Background

Rhona McGlasson, RPT, MBA

Pre operative care and surgery

Valerie Zellermeier, RN, MHSc, CPN

Immediate post operative care

Valerie MacDonald, MSN ONC

Pain management

Dr. Nick Lo, MD, FRCPC

Valerie MacDonald, MSN ONC

Osteoporosis

Donna Spafford, RN, Dipl PH, BA

Dementia, delirium, depression

Janet Legge McMullan, RN, BScN, MN

Functional recovery

Lauren Beaupre, PT, PhD

Care transitions

Joanie Sims Gould, PhD, RSW

Tina Saryeddine, PhD, MHA/CHE

Janet Legge McMullan, RN, BScN, MN

Falls prevention

Vicky Scott, PhD, RN

Evaluation

Rhona McGlasson, RPT, MBA

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Background

Almost 30,000 people across Canada experience a hip fracture each year. Despite ongoing improvements in surgical and rehabilitation interventions, a hip fracture is uniquely challenging for the patient, their family, the healthcare professionals that provide care, and the overburdened healthcare system. Hip fractures can frequently lead to significant mortality, morbidity and the loss of independence despite many of these patients living successfully at home prior to their injury.

Over the last few years a number of provinces/territories across Canada have developed hip fracture models of care to better address the complex needs of this patient population, including work in Ontario, British Columbia, Alberta, Manitoba, New Brunswick and the Northwest Territories. This National Hip Fracture Model of Care and Toolkit draws on the experiences of these provincial initiatives and is designed to provide recommendations on best practice throughout the patient's continuum of care.

System Costs

In 1996/97 the annual costs to care for hip fracture patients was estimated at 650 million dollars. With the current aging population, by 2041 the economic burden is expected to rise to 2.4 billion annually. Direct healthcare system costs are approximately \$27,000 per patient; with costs as low as \$21,000 for patients discharged home, and as high as \$47,000 for those transitioned to long-term care.

Toolkit Design

This Toolkit was designed to provide information on best practices as they are cited in the literature. It also integrates the best current practices in system design and the management of patient flow to maximize the recovery of hip fracture patients. Each section of the Toolkit was developed by healthcare professionals identified as an expert in their field and was also reviewed for its applicability by healthcare professionals across the country through a number of opportunities to provide structured feedback including teleconferences and documentation review. This document does not address funding or resource allocation which is the responsibility of health service organizations, regions and provinces. The Toolkit is therefore designed as a guiding document to facilitate performance improvements and Bone and Joint Canada (BJC) is not responsible for the implementation of the project at a local level.

The Toolkit includes a Resource Folder to share materials and resources that will be useful in the development of a hip fracture program or in performance improvements initiatives across the continuum of care. These resources are available to all healthcare professionals across Canada and include operational documents such as sample forms, educational materials, care plans and performance indicators. This Resource Folder is available at the BJC website at www.boneandjointcanada.com.

The Resource Folder is intended to provide documents that facilitate the development of clinical programs through access to the work already initiated across Canada. Due to a lack of high quality supporting evidence, BJC does not endorse the individual items in the Resource Folder but makes the information available for consideration.

System Structure

Following a hip fracture, patients move through a continuum of care where their initial need is for surgery, then treatment to promote medical recovery followed by a focused approach to facilitate functional recovery. This approach requires a coordinated system through which the patient's care needs are met.

There are numerous barriers for this patient population to flow through the system however the most significant access barriers are:

A. Access to Surgery

The literature shows that patients require access to an operating room within 48 hours of admission to the first emergency room for surgical repair otherwise they experience negative consequences. There is emerging information that patients over 80 years old may require surgery within 24 hours of a hip fracture. There are many factors that affect access to surgery including the availability of human resources, access to surgeons, access to other resources such as operating room availability, and a proactive systems approach that ensures all patients are able to get to the operating room wherever they are admitted.

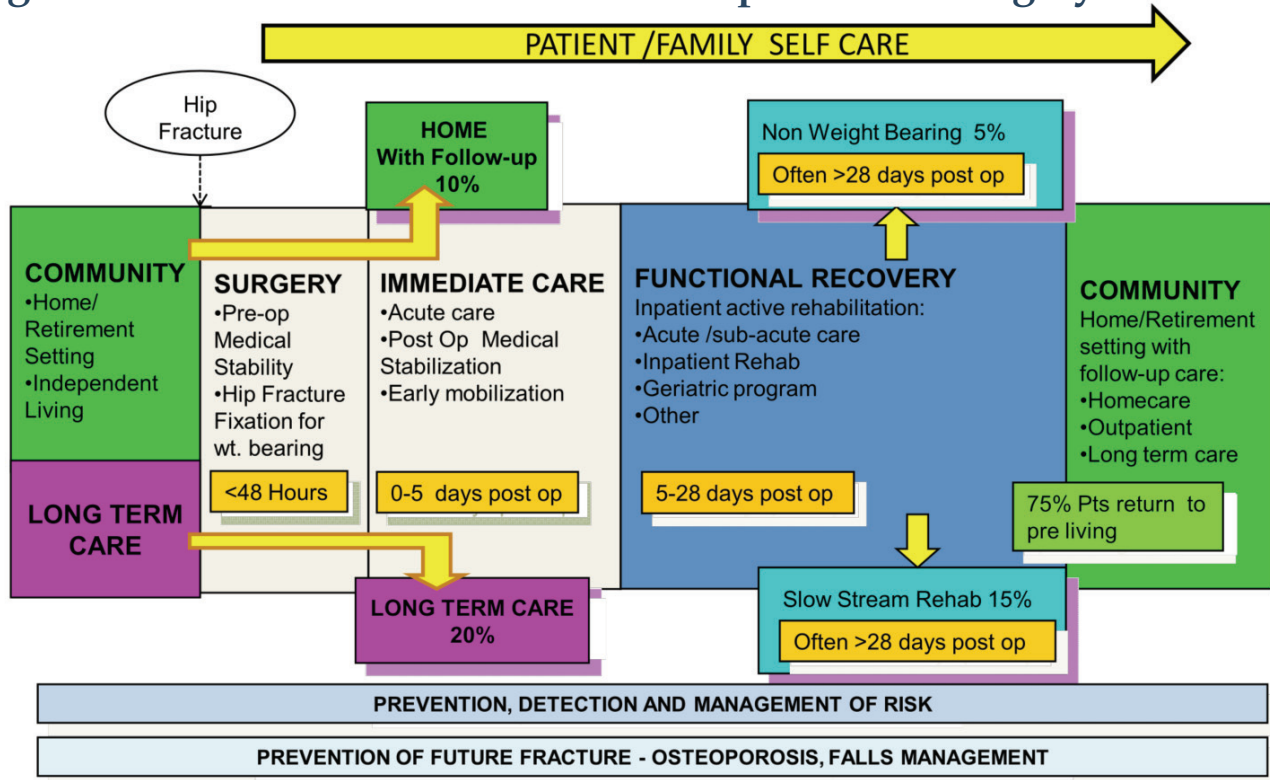
B. Access to Rehabilitation

Many hip fracture patients are frail and present with, or are at high risk of developing, cognitive deficits. For patients with known cognitive deficits, questions arise about a patient's rehabilitation potential related to their ability to follow commands and/or retain information. In some cases, known cognitive deficits have resulted in refusal of admission to rehabilitation units for treatment. However many of this patient population responds well to an intensive structured rehabilitation approach which can facilitate a return to independent function.

National Model of Care for Hip Fracture Patients

The National Model of Care is an important component of the Toolkit as it provides a vision of the care continuum for hip fracture patients from their entry into the acute care hospital, through the emergency department and through to their discharge. This model facilitates recognition of the systems approach to care and helps healthcare organizations to identify how they fit into the continuum of care. The Model of Care was developed through the synthesis of the system approaches being used to manage the hip fracture patient population across Canada as well as internationally.

Figure 1: National Model of Care for Hip Fracture Surgery



Adapted from BJHN 2008, Mahomed et al., 2008; McGilton et al., 2009; BOA, 2007; SIGN, 2002

This model has been developed with the focus of providing care to eventually return patients to their pre-fracture living situation thereby returning the majority of patients home. Implementation of the model requires a systems approach across the continuum of care where patient access and patient transition is considered and is pre-planned wherever possible. As identified above, specific access issues that require careful consideration are access to surgery and access to functional recovery in a designated setting. For patients that return home and to their place of care in a Long Term Care home it is important that they are able to access the rehabilitation services available within their community settings. For patients who are unable to return home access to functional recovery may take place in the acute care hospital, however often requires transition to another unit and/or hospital. The Model of Care recommends that all patients have access to functional recovery treatments independent of their physical or cognitive status. As such, the local healthcare system needs to ensure factors such as admission criteria are not barriers to access and care. Resources also need to be available to provide services in each unit/organization specifically in the facilitation of functional recovery as well as the risk reduction and management of the potential medical and cognitive complications.

System Considerations

The care journey for a hip fracture patient through the Model of Care requires a systems approach where barriers to care are addressed. Discussions therefore need to take place at a local, regional and provincial level and the following needs to be considered to maximize the effectiveness of the programs and clinical care.

1. Leadership

For successful implementation and ongoing management of this patient population there needs to be clinical, administrative, and government leadership that aligns their support and provides direction for the project. This leadership needs to occur at a provincial level, such as through an expert panel to address and/or provide advice on provincial matters such as funding and data requirements; a regional level to assist with the focus on regional programming to move patients through the system; and at a hospital level to address local clinical issues. It is recommended that these layers of governance build on one another to create a comprehensive governance structure for system improvement.

2. Pre-planned System

Within a healthcare system clinical staff do the work that they are required to do within the resources and structure that are set up to perform the activity. Although the clinical staff may well understand that the system is ineffective to meet the patients needs they have little influence to change the day-to-day operations. There are many pressure points in a healthcare system where there is the opportunity for system improvements. One of the most successful strategies in the management of these system issues is to pre-plan the system to ensure maximum access for patients and maximum utilization of resources (e.g. move patients to rehabilitation with access back to acute care for tests etc.)

3. Change Management, Education and Knowledge Translation

The implementation of the Model of Care and Toolkit may require changes at a local hospital level in the acute care and in the rehabilitation sectors. Management of this complex patient population requires a proactive approach for sharing of information and for staff education to ensure they have the relevant skills. As such, an open supported learning environment is recommended.

4. Additional Programs

The National Hip Fracture Toolkit builds on many of the best practices that are already identified for other patient populations including the work on dementia, delirium, falls and osteoporosis. It is recommended therefore that, whenever appropriate, implementation of changes for hip fracture patients builds on best practice initiatives and programs that are already underway within the hospitals such as frail seniors, falls, osteoporosis, dementia delirium and other senior friendly initiatives.

5. Funding

Funding incentives need to align with system flow to promote patient access, specifically to the operating room and rehabilitation services and to promote patient outcomes.

6. Performance Measurement and Reporting

A reporting system that promotes open and transparent sharing of data and information between healthcare organizations is key to the success of this initiative. Healthcare organizations need to be aware of the supporting activity of organizations both upstream and downstream in the care continuum.

7. Accountability

The health system accountability structures need to align to promote the patient's flow through the system and to hold the most appropriate health service organizations accountable for performance.

8. Capacity Planning

Once implemented successfully, the Model of Care provides a continuum of care which quantifies the numbers of patients moving through the system and facilitates the ability to complete capacity planning to ensure access to surgery, acute care beds, and rehabilitation.

Developing this system approach will facilitate the level of discussion required for a successful implementation of the Toolkit across the healthcare continuum in each local region and at a provincial level.

For further information see "BJHN Provincial Hip Fracture Report" in the Resource Folder.

Guiding Principles in Care

The hip fracture patient is often frail with complex biopsychosocial needs. The following guiding principles have therefore been identified for consideration when caring for a person who has sustained a hip fracture.

1. Where surgery is indicated it needs to occur in a timely manner (within 48 hours of admission to the first emergency room) so as to maximize the patient's ability to take part in active functional treatment following the surgery.
2. For the first 48 hours after surgery and often longer, the patient is medically unstable and requires skilled monitoring and careful titration of fluids and medication by a registered nurse (e.g. analgesics, diuretics).
3. Adequate nutritional intake, frequent mobility and toileting are essential for recovery and are a priority in care beginning the day of surgery. A multidisciplinary approach to care and adequate staffing are required to achieve this.

4. Foreseeable risks and preventable problems result in complications, added morbidity, mortality and functional decline. Programs designed to prevent, detect and manage these risks/problems will improve the patient experience, optimize outcomes and improve flow through the system.
5. Many of these patients require close monitoring and a coordinated multidisciplinary approach to ensure continuity of care with a focus on returning the patients to their pre-living arrangements.
6. Physicians, nurses and the interdisciplinary team members caring for these patients require ongoing education to become acute care and rehabilitation orthopaedic geriatric specialists.
7. The promotion of patient/family self-care will reduce distress and build capacity for recovery and a successful transition to home, another setting for functional recovery/rehabilitation, or a long-term care facility.
8. Early planning for care transitions, including final discharge needs to include patients and families and is fundamental to the care of the patient and requires a coordinated or case management approach
9. Patients often have two or more serious co-morbid conditions, with several medical services involved, multiple medications, and challenges with social isolation and frail partners. Ongoing functional enhancement and management of medical conditions following discharge to the community is required to optimize recovery.
10. Implementation of fall prevention plans during the hospital stay and post discharge are essential for the prevention of future injuries, including another hip fracture.
11. Hip fractures place these patients at high risk for secondary fracture. Assessment for osteoporosis, risk factors for fracture, prevention and treatment are necessary and should be initiated before discharge.
12. For patients that are non-mobile preoperatively with advanced dementia the goals of care should reflect a palliative approach.
13. A data management system which tracks organizational performance in the management of this patient population against defined system level targets is required to ensure care.

Preoperative Care

The hip fracture patient undergoes a complex journey through the healthcare continuum where a coordinated care approach is required. This approach needs to occur at the patient's first contact with the healthcare system, which in many cases is through the Emergency Medical Services. A pre-planned process flow map is recommended to ensure that all patients receive consistent seamless flow of excellent care which is effective, efficient, safe, integrated, patient centered, cost-effective and timely from the time of arrival at the hospital. The goal is for surgery to be performed as soon as possible following the fracture. However, from a system measurement perspective, this can only be realistically measured from admission to the first emergency room, and surgery should be performed within 48 hours of admission.

Addressed in this preoperative section are:

- Regional planning
- Emergency consultation
 - » Transportation
 - » Early triage, recognition and assessment
 - » Early orthopaedic consultation
 - » Social Assessment
- Preoperative management
 - » Preoperative care location
 - » Standardized clinical care
 - » Pain management
 - » Osteoporosis management
 - » Delirium prevention
 - » Medical reconciliation and intervention
 - » Hydration
 - » Prevention of Pressure Ulcers
 - » Nutritional Status
 - » Hypoxia
 - » Urinary Catheterization
 - » Anticoagulation
 - » Preoperative Thromboprophylaxis
 - » Preoperative Thromboprophylaxis Options
 - » Management of Patients on Clopidogrel (Plavix®)
 - » Management of Patients on Warfarin (Coumadin®)

Regional Planning

The clinical care for hip fracture patients needs to be managed throughout their stay within the healthcare system. In regional hospitals where there is no access to an orthopaedic surgeon, a pre-planned process should be in place to ensure transfer of patients for their surgery with a

well organized plan for repatriation to the sending facility. This process map would include transfer of accountability between physicians thus ensuring access to quality care.

- › Processes need to be designed to ensure that the transfer of patients arriving at the emergency department of a hospital without access to orthopaedic surgeons occurs in a timely and organized manner.
- › The system plan allows for immediate transfer to a partner organization while requiring the transferring organization to optimize the patient for timely surgery and identifies a repatriation post surgery to the patient's local organization and/or community rehabilitation.
- › A protocol needs to be developed within each region so that a patient is transferred to a hospital where there is the capability and capacity to manage the hip fracture.
- › The initial admitting hospital needs to be familiar with the management of the hip fracture patient including prevention strategies to prevent future risks and complications.
- › The system should be streamlined wherever possible so that tests including blood work and diagnostics can be completed as necessary and the information is shared so that tests are not repeated for unnecessary reasons.

Emergency Department

Patients diagnosed with a hip fracture and requiring surgery are most likely to present in the emergency department by ambulance or through a referral process with some organizations supporting direct admission to an inpatient unit. Either way, the goals are identical: streamlined triage, assessment, diagnosis and prompt medical optimization for surgery. It is an expectation that developed pathways/guidelines are available, initiated, understood and implemented by all team members from triage team to surgeon towards the goal of early surgery.

Transportation

The care continuum needs to include the patient's journey to the emergency department and often to the hospital where surgery is to be provided. Pre-planning with the local Emergency Medical Services will require direction on:

- › Regional planning models for the Emergency Medical Services to transport patients directly to the hospital where surgery can be provided.
- › Processes that are in place to transport patients from the emergency department to the nearest local hospital for surgery when surgical capacity is confirmed.

As the care continuum starts with medical management in the emergency services, the development of protocols for the use of early oxygen and analgesics while transporting the patient should be considered.

Early Triage, Recognition and Assessment

In order to minimize delays for surgery, emergency department triage should be designed to recognize and fast track patients with a potential hip fracture for early assessment within the first hour in the emergency department. Hip fracture patients are frequently older patients and their symptoms may be unclear. However, their initial assessment may include a history of a fall, weakness, and pain when attempting to mobilize. Early recognition through examinations (shortened leg, external rotation) should prompt healthcare providers to move patients to the high priority pathway. This pathway should ensure assessment by the emergency department team/physician within 1 hour of admission to the emergency department. The development of order sets and accompanying medical directives will ensure consistent and standardized care supporting best practice guidelines so as to expedite the diagnosis and care processes. Orders will include: tests for appropriate blood work; X-rays; management of hydration, pain, and delirium; as well as minimizing the risk of pressure sores. Equally important in the initial history is the assessment and documentation of the method of injury, previous mobility, mental state, activities of daily living, social status, and acute and chronic co-morbid conditions. This should include consideration of why the patient fell.

Early Orthopaedic Consultation

Referral for consultation by an orthopaedic surgeon or the emergency room doctor is targeted for no later than 2 hours after admission to ensure a timely diagnosis, and to obtain consults that will determine the goals of care, inpatient admission, and the plan for booking surgical facilities.

Anaesthesia and/or internal medicine will be consulted by the orthopaedic physician to identify potential risks and to optimize the patient for surgery. Regardless of an organization's routine processes, any delays in access to an inpatient bed should not result in a delay in the anaesthesia and/or medical consultation, when needed.

Social Assessment

Planning for the patient's care transitions includes identifying opportunities for discharge. This planning begins through the completion of a social assessment when the patient arrives in the emergency department. The social assessment includes:

- › pre-fracture abilities
- › physical and functional level
- › cognitive status
- › existing community supports
- › family involvement

This information is helpful in making informed surgical decisions. For example, individuals in frail health or with impaired cognition should receive surgical fixation to allow immediate weight-bearing as tolerated postoperatively. Non weight-bearing or feather weight-bearing may be acceptable in younger, healthier patients, but should not be considered usual practice. It is recommended that information gathered in the initial assessment be included in the community discharge package in planning for patient discharge. This topic will be discussed at length later in this document.

Patients and families should be actively involved and informed in the continuum of the care plan for hip fracture patients while in the emergency room and should be provided with education, including written information, where appropriate.

Preoperative Management

The preoperative management of this patient population is crucial to achieving a successful outcome on discharge. Many individuals who sustained a hip fracture are medically complex with significant care needs and are in pain which puts them at increased risk for medical complications such as pressure sores and cognitive deterioration. The focus of preoperative care must be to safely get patients to surgery as quickly as possible so they can begin their functional recovery.

Preoperative Care Location

Recognizing the risks of complications for which hip fracture patients are vulnerable, consideration needs to be given to their transfer onto an inpatient unit where their needs can be monitored closely.

Standardized Clinical Care

The use of standardized tools including clinical care maps, clinical pathways, pre-printed orders and educational materials is recommended to standardize the care process for hip fracture patients. The use of these tools should start on the patient's admission to the emergency departments and address their issues within the preoperative phase of care including medical stabilization for surgery, prevention of complications and assessment of risk for future fracture.

Pain Management

Evidence-based pain assessment tools and pain scales should be used to assess the patient's pain levels early in the admission process. The assessment should take into consideration pre-hospital pain conditions and pain medications. Pre-hospital long acting pain medications should usually be continued to ensure adequate analgesia.

For those patients who cannot express themselves verbally the use of non-verbal pain scales is recommended. Pain relief for these patients has been shown in practice and clinical studies to be frequently under-managed. Effective pain management for this population is essential to

reduce the incidence of complications such as delirium and constipation which are discussed later in the Toolkit.

Multimodal analgesia should be considered whenever possible. It is the concept of using more than one drug which act at different places or with different mechanisms. Often this allows each drug to be used at a lower dose than if used alone. Multimodal analgesia provides better pain relief with less side effects (ie. acetaminophen + opioid ± NSAID).

Options include:

- › Titration of opioids + adjunct (ie. acetaminophen)
- › Scheduled opioid administration and bolus dosing as required + adjunct
- › Patient-controlled analgesia, if available and patient able to use, + adjunct
- › Regional nerve block (i.e. fascia iliaca compartment block) + adjunct ± opioid

Osteoporosis Management

Ninety-five percent of hip fractures are related to a fall, which is a hallmark for osteoporosis. Therefore, a patient's bone health and risk for re-fracture needs to be assessed throughout their hospital stay. This assessment should begin in the emergency department and include patient's awareness of osteoporosis and their current treatments. The patient and their family needs to be made aware of treatment options before discharge. (See Osteoporosis Section).

Delirium Prevention

Hip fracture patients are at high risk for delirium preoperatively, while at the same time about 17% of hip fracture patients enter the hospitals with a known diagnosis of dementia. In addition, a significant unknown number of patients have cognitive deficits that are unmasked at the time of fracture. Assessment and prevention strategies are therefore crucial to the management of the patient at admission to the emergency department. Assessment can be completed through a number of screening tools and prevention needs to include medical management and control of pain. (See Cognitive Section.)

The patient's family should be encouraged to stay and participate in the patient's preoperative management for as long as possible before they go to the operating room as a method to support orientation to place and time.

Medication Reconciliation and Intervention

With the complexities of this patient population, medication reconciliation is critical to ensure that the patient is on the appropriate medication for the co-morbidities as well as to address any potential drug interactions. This can be completed within the emergency department using a standardized form completed by a geriatric nurse or a pharmacy technician. Consideration also needs to be given to ensuring appropriate medication doses for the elderly, and to identify any potential that the medication regime was the cause of the patients fall.

Hydration

Maintaining levels of hydration/ fluid balance are important for patients especially as it relates to preventing delirium. However, hydration needs to be monitored closely to prevent potential harm.

Prevention of Pressure Ulcers

There is a significant risk of pressure ulcers related to the pain and lack of mobility experienced by hip fracture patients specifically prior to the surgery. Their general skin condition needs to be assessed, especially pressure points and the perineal area. These observations need to be recorded on admission and at least twice daily. Regular patient repositioning, at least every two hours and pressure reduction strategies, such as heel protection, also need to be considered. Use of a standardized form such as the Braden Scale is recommended to be completed on all hip fracture patients.

Nutritional Status

Adequate nutrition is vital for the body's normal functioning especially after a trauma resulting in a fracture. Patients will deteriorate quickly if their nutritional status is not maintained throughout their preoperative care. Every consideration must be given to ensure the patient is absorbing sufficient nutrition.

The Canadian Anesthesiologists' Society guidelines for fasting are:

- ≥ 2 hours – Clear fluids
- ≥ 6 hours – Light meals (i.e. toast, non-human milk)
- ≥ 8 hours – Heavy meals (i.e. meat, fried or fatty foods)

Most anesthesiologist allow for oral medications to be taken while fasting which a small sip of water. If there are delays in the patient accessing the Operating Room for their surgery there needs to be consideration to the effects of fasting and the patients nutritional status must be restored and maintained.

Hypoxia

Hypoxia is common due to age-related reductions in pulmonary capacity, pre-existing respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), pneumonia, and medications such as opioids and other sedating agents. For the hip fracture population hypoxia can be related to bleeding resulting from the fracture. As such, laboratory values, pulse oximetry and vital signs must be monitored on a regular basis. Oxygen needs to be applied to maintain oxygen saturation levels at 92% or higher, or as appropriate if the patient has COPD.

Urinary Catheterization

The use of permanent catheters should be avoided wherever possible. Protocols that restrict the use of catheters and offer the use of alternative approaches are recommended.

Anticoagulation

Thromboprophylaxis has been shown to be highly effective in preventing venous thromboembolism (VTE) in hip fracture surgery patients and should be initiated with the diagnosis in preparation for surgery. There is supporting evidence that thromboprophylaxis reduces all-cause mortality in this patient group. However, thromboprophylaxis should not occur within 12 hours prior to surgery.

Preoperative Thromboprophylaxis

If surgery is likely to be delayed more than 24 hours, it is recommended to start thromboprophylaxis with an anticoagulant that has a short half-life (so as to not interfere with regional anaesthesia decisions or intraoperative bleeding). Since the availability of the operating room for hip fracture surgery is often not precisely predictable, it would be reasonable to order preoperative thromboprophylaxis at the time of admission to avoid missing this opportunity to reduce venous thromboembolism rates.

Preoperative Thromboprophylaxis Options:

1. A low molecular weight heparin:
 - › dalteparin (Fragmin®) 2,500 units subcutaneously every night
 - › enoxaparin (Lovenox®) 30 mg subcutaneously every night
 - › tinzaparin (Innohep®) 3,000 aXa units subcutaneously every night
2. Heparin 5,000 units subcutaneously twice a day.
3. Venous thromboembolism treatments that are not recommended/supported by evidence include:
 - › Preoperative traction
 - › Pressure gradient stockings

For more information visit: www.saferhealthcarenow.ca.

For information on anticoagulation and regional anesthesia, visit:

<http://www.asra.com/publications-anticoagulation-3rd-edition-2010.php>

Management of Patients on Clopidogrel (Plavix®)

Hip fracture patients are often older persons that may present with co-morbidities that may require them to take clopidogrel. Clopidogrel was originally designed and introduced as a drug for stroke prevention, and more recently has become widely used for patients who have undergone coronary artery stenting procedures. It is important to ascertain whether the indication for clopidogrel, and cardiology consultation is highly recommended for patients with coronary stenting prior to clopidogrel discontinuation, to avoid in-stent thrombosis.

Because of the need for surgical repair within 48 hours, hip fracture patients on clopidogrel will still have clinically significant antiplatelet activity at the time of surgery. Current literature

indicates that there are no serious surgical complications or increased transfusion requirements for patients on clopidogrel. The goal for patients on clopidogrel should still be early operative intervention to decrease morbidity and mortality associated with surgical delay for hip fracture patients.

Management of Patients on Warfarin (Coumadin®)

Long-term anticoagulation treatment with warfarin has become more prevalent in a variety of conditions such as atrial fibrillation, prosthetic heart valves, acute venous thromboembolism and transient ischaemic episodes. These conditions most commonly occur among adults over the age of 65. Since hip fracture is prevalent among this population, warfarin management needs to be considered within orthopaedic care. First-line therapy for the reversal of warfarin anticoagulation is Vitamin K. For surgery greater than 6 hours away, administration of intravenous Vitamin K (5-10mg) should be sufficient for reversal. If more urgent reversal is required (less than 6 hours), compounds such as prothrombin complex concentrate (PCC) (i.e. Octaplex®) or frozen plasma may be considered along with the use of intravenous Vitamin K. PCC is probably the preferred choice over frozen plasma for those at risk for volume overload.

Further information can be found in the document “ER and Pre Op Clinical Practice Guidelines” available in the Resource Folder.

Surgery

Timely access to surgery for patients following a hip fracture is critical and a benchmark of 48 hours has been set within Canada. Lack of timely access is frequently linked to significantly higher rates of mortality, increased morbidity and a subsequently reduced potential for successful rehabilitation.

However, there is an increasing demand for rapid access to surgery for a number of specific disease states. Therefore, a clear pathway and open communication that prepares both the patient and the operating room in an appropriate manner increases each patient’s access by ensuring a streamlined process to perioperative care.

The following areas are addressed within this section:

- Operating Room Priority Management:
 - » Scheduling surgery for fractured hips.
 - » Designated trauma/fracture time
- Surgical Processes
 - » Considerations in surgical care
- Operating Room

- » Standardization
- » Minimal Surgical Site Infections
- » Surgical Safety Checklist
- » Intra operative Anaesthesia
- » Surgical procedures
- » Positioning
- » Normothermia
- » Post operative Pain Management
- Post-Anaesthetic Care Unit (PACU)
 - » Management of symptoms
 - » Length of stay
 - » Discharge criteria
 - » Family role in PACU
 - » Sterile processing department (SPD)

Operating Room Priority Management:

Typically all operating rooms have policy and guidelines to facilitate appropriate access to surgery for those patients where surgery is deemed emergent, urgent or semi –urgent. While this may vary from province to province, most healthcare organizations follow a similar model.

These scales establish a priority ranking for surgery according to bands of timelines e.g. immediate access to surgery or within 2 hours.

- › access within 2-8 hours
- › access within 8 -24 hours.
- › access within 24 - 48 hours.

Perioperative priority rankings are typically measured from time of scheduling in the operating room vs. time of injury or decision for surgery. In the case of a fractured hip the goal is to provide access to surgery as early as possible in the patient journey based on the patient being optimized for that intervention.

Patients with a fractured hip will fit into the 24-48 hour ranking, dependent on when their fracture occurred, how long their pre-admission to treating emergency department time was and if their readiness for surgery was prolonged.

The goal of best practice access for surgery may be measured in days or in hours but the plan should be standardized with the intent to ensure patients get their surgery no later than 48 hours or 2 days after their admission to the first emergency room. Where possible, earlier access is preferred.

- › It is recommended that each operating room develops guidelines in collaboration with all stakeholders to ensure that there is common language that facilitates priority booking for patients with a fractured hip.
- › These guidelines should speak clearly to the benefits of early access, allowance of regional anaesthesia if appropriate, and appropriate booking of intended surgical technology.
- › Guidelines must align and be inclusive of the broader organization policy and procedures for booking urgent cases and the accompanying urgent surgery booking. This form will ensure the operating room has sufficient information to adequately prepare for the care.

Scheduling Surgery for Fractured Hips.

Urgent surgery by its nature is not well structured and, as a result, ensuring timely access, and limiting ‘bumping’ for more urgent surgery is a critical consideration for this population. While all healthcare resources are valuable, the operating room is a particularly costly resource making the collaboration of healthcare providers and support services that impact patient flow essential.

Scheduling of a fractured hip is usually through the urgent booking system. Often the wait time for patients with fractured hips is longer than optimal. Orthopaedic services should have predetermined processes for early notification of the operating room for pending surgeries.

Organizations should develop a methodology where the case may be booked as a repair of a fractured hip at initial booking. Once the diagnosis/review of imaging is complete and the methodology/technology decided, the operating room booking should be updated with the details of the intended surgery. This will reduce delays and eliminate waste as a result of incorrect case cart preparations, and operating room readiness.

Where possible, the intended anaesthetic approach should be added to the booking information as per the scheduled surgery. For perioperative practices, which are fortunate to have a separate regional room, consideration should be given to enabling access to these patients preoperatively.

Designated Trauma/fracture Time

Operating room guidelines should clearly spell out expectations for access of these patients and ensure rules are established restricting preempting of patients with fractured hips. A number of strategies are offered here:

- › In organizations where demand is consistent, the operating room and orthopaedic leadership teams can consider reallocation of their resources to match these

variable needs. For example, the allocation of operating room time to repair fractures can be assigned up to 3 days per week during daytime hours. This enables timely access for fractured hips when there is better access to regional anaesthesia resources and the interdisciplinary perioperative team.

- › Many operating rooms assign orthopaedic trauma or fracture time during regular day time hours to facilitate urgent orthopaedic fracture cases. In this way, patients receive timely operating room access while reducing demand for extended ‘off hours’ surgery and / or prolonged length of stay awaiting surgery.
- › Alternately, organizations provide urgent / trauma time open during routine hours and available to all services.

Surgical Processes

This section will provide the recommended components for the surgical care of hip fracture patients, along with resources and tools for implementation.

Considerations in Surgical Care

A. Coordination of the surgical flow process

To aid cross continuum focus in patient flow and to utilize the resources within the surgical area effectively, efficiently and safely, coordination across the healthcare disciplines, surgical departments and support services is imperative. The surgical departments and support services include, but are not limited to, pre-admission or surgical screening, operating room scheduling and the operating room, the post-anaesthetic care unit (PACU), the sterile processing department (SPD), distribution, cleaning, portering, and supply management. In essence, this is the surgical team. Facilities across Canada may use a variety of names for similar departments and services.

B. Surgical scheduling

In the case of a fractured hip, the emergency department can substitute for a pre-admission screening. The case may or may not be included in the surgical scheduling depending on scheduling systems and surgical plans. For example, organizations that have concurrent or real time automation of perioperative systems will enter the case into their urgent scheduling waitlist or the prescheduled urgent orthopaedic time. Perioperative pathways with predictive models for surgeon specific average surgical time and required surgical needs can be used.

C. Patient safety

Patient safety is a priority consideration in order to reduce surgery related complications and other potentially avoidable adverse events that may be caused by human healthcare resource issues. Patient safety is also a priority consideration due to the added complexity related to changing technologies and standards. Many resources are available to assist with a patient safety culture in the perioperative stage including Safer Health Care Now, World Health As-

sociation, and the Institute for Healthcare Improvement. These resources provide information and tools such as safe surgery checklists, operating room time-outs or surgical pauses, and correct procedure and site identification.

Resources

Safer Health Care Now Website (Surgical Site Infection), SSCL

<http://www.saferhealthcarenow.ca/EN/Pages/default.aspx>

World Health Association (WHO): Safe Surgery Saves Lives! (Safe Surgery Checklist)

<http://www.who.int/patientsafety/safesurgery/en/>

Institute for Healthcare Improvement Website (Pausing for Safety), <http://www.ihl.org/IHI/>

D. Consent

Informed consent for surgery is obtained by the orthopedic surgeon prior to arrival in the pre-operative care unit/operating room. Informed consent typically includes consent for the specific surgery/site, for the accompanying anaesthesia, blood and an explanation regarding associated risks for each patient. Consent for surgery is documented and signed by the patient or by a substitute decision maker, usually next of kin, if the patient is not capable of providing personal consent.

E. Family involvement

The operating room setting can be a terrifying environment for the frail elderly and strong consideration should be given for extended accompaniment of family and significant others in preoperative care areas until the patient is admitted into the operating room itself.

F. Risk prevention strategies

Particular care is required to minimize the risk of complications. Specific to the operating room are considerations in positioning, tools to prevent the development of pressure sores, and methods to minimize delirium and the effects of dementia.

G. Surgical intake

Patients may come to the operating room preoperative care unit from their inpatient unit or from the emergency department. The surgical intake is dependent on the patient's preparedness to undergo the surgery. The following needs to be considered:

- › Streamlined patient preparation needs to be developed as part of the perioperative journey.
- › Best practice perioperative care pathways should restrict skin pressure during surgery, avoid indwelling catheterization where possible, and minimize conditions that exacerbate delirium.
- › Standardized care pathways may be utilized that include pre-printed physician orders.

- › Concurrent tasking should be employed where possible to facilitate efficiency and patient flow.
- › Patients need to have the correct surgical site identified and initialled by the surgeon and confirmed by the patient before surgery.
- › Preoperative skin cleaning of the surgical site with antiseptic such as a chlorhexidine gluconate (CHG) based product is recommended. Disposable CHG impregnated cloths are one example of available products for use.
- › Patients receiving neuraxial anaesthesia will ideally begin their care in a regional block room if such a resource is available. These units are ideally equipped and prepared to facilitate successful access and minimize patient discomfort during the procedure.
- › Communication is maintained between intake area, the operating room and portering to facilitate transfer to the operating room.

Operating Room

Best practice, standardization, concurrent tasking, and a collaborative approach aid in smooth patient flow and efficient usage of operating room time. Recommended practice for the operating room includes:

- » Standardization
- » Minimizing Surgical Site Infections
- » Surgical safety checklist
- » Intra operative anaesthesia
- » Surgical procedures
- » Positioning
- » Normothermia
- » Postoperative pain management

Standardization

Standardization in practice within the operating room is important to ensure the operating room scheduling stays on time and maximizes efficiency. Standardization therefore needs to be considered in the following:

- › Determination of the surgical technique can vary based on the type of fracture and patient disposition. However, decisions once made should follow a standardized process regardless of team members.

- › Preparation of the operating room and table positioning devices take into consideration the intended surgery and the disposition of the patient.
- › Standardization of instruments and products facilitate setup, surgery and efficiency.

Minimizing Surgical Site Infections

Surgical site infection is the most commonly occurring hospital related infection for patients undergoing surgical procedures. Hip fracture patients with significant co-morbidities are particularly prone to develop postoperative infections. As a resource, “Safer Health Care Now” recently released the updated document: Prevent Surgical Site Infections: Getting Started Kit in September 2010. (www.saferhealthcarenow.ca)

Goals to prevent Surgical Site Infections (SSI) include:

1. Antimicrobial coverage perioperatively
 - › Appropriate use of prophylactic antibiotics
 - › Timely administration of the right antibiotic at the right time within 60 minutes of cut time, excluding Vancomycin (within 120 minutes)
 - › Antiseptic prophylactics
 - › Preoperative surgical site cleaning
 - › Preoperative skin preparation.
 - › Recent evidence suggests CHG-alcohol as the preoperative antiseptic of choice. The correct application of skin preparation is critical for this population to avoid contamination of the surgical site from the groin.
2. Appropriate hair removal
 - › Ideally no hair removal should occur. If hair removal is deemed necessary for a specific patient then minimum clipping is recommended just prior (no earlier than 2hours) to the surgery time. Care must be taken to avoid damage to the skin when clipping occurs.
3. Maintenance of perioperative glucose control.
4. Perioperative normothermia.

Surgical Safety Checklist

The use of the surgical safety checklist is an expected safety practice in Canada and is being implemented worldwide.

The surgical safety checklist consists of three sections.

- A. **Briefing:** The entire surgical team participates in a briefing prior to the surgery, which

includes introductions, confirmation of correct patient, site, side, plan of care, patient consent, diagnosis, co-morbidities and other critical information such as availability of required prosthesis, blood, etc.

Team members participate in the briefing, time out and debriefing according to their area of practice and share critical information with regards to the patient and planned surgery.

- › Venous thromboembolism prophylaxis is confirmed at surgical briefing.
 - › Antibiotics prescribed are confirmed as correct and administered to the patient. Antibiotics for surgical procedures are given within 60 minutes of cut time with the exclusion of Vancomycin, which is to be given 2 hours prior to cut time.
- B. **“Time out” or “surgical pause”:** Occurs just prior to cut time. The team verbally confirms again the correct patient, procedure, location of surgery, diagnostics, antibiotics given and patient team readiness to proceed to surgery.
- C. **Debriefing:** Includes a summary of the case, confirmation of a correct count, surgery completed and a debriefing of case specific details.

The conversations for each section follow a set format as described by the checklist and support team communication and safe practices.

Intraoperative Anaesthesia – Neuraxial vs. General Anaesthesia

A recent comprehensive systematic review by the Cochrane database group showed decreased postoperative confusion when using regional anaesthesia. There were also other reported benefits of regional anaesthesia, such as decreased thromboembolism development, decreased intraoperative blood loss, and decreased short-term mortality. However, insufficient large-scale, multi-study data exists to make definitive conclusions.

Common North American neuraxial regional anaesthesia techniques include single-injection spinal (intrathecal) anaesthesia, epidural catheter anaesthesia and combined spinal-epidural (CSE) anaesthesia. The type chosen depends on expected surgical complexity and duration of surgery, as well as co-existing patient factors. Often, intravenous sedation is co-administered during the operation to enhance patient comfort.

There are many reasons which preclude the use of neuraxial anaesthesia, and therefore require a general anaesthetic such as anticoagulation, patient refusal, and challenging anatomy. Ultimately, the choice of anaesthesia administered rests in the hands of the attending anaesthesiologist.

Surgical Procedures

There are a number of different types of proximal hip fractures all of which demand a thoughtful, individualized approach for optimal surgical results to be achieved. Prior to the surgery,

there must be consideration of the fracture type as well as of the patient's level of function, comorbidity and other health considerations including pre-existing musculoskeletal problems.

There are potential complications following surgery including implant failure, mal-union, and surgical morbidity. These must be balanced with the recovery potential for the patient including their rehabilitation needs. For patients admitted from home and / or have been previously mobile, the need for immediate weight-bearing is of paramount importance in promoting future recovery as it has been shown to decrease medical complications, decrease mortality, and improve functional recovery and functional outcome. Immediate postoperative weight-bearing increases the likelihood of transfer to a rehabilitation setting and an accelerated discharge from acute care, with the eventual return home or to an independent living setting.

In the past, there was concern that early ambulation and weight-bearing might lead to implant failure, malunion or nonunion in patients with unstable fracture patterns that had been tenuously fixed. In modern hip fracture care this is no longer an issue for the following reasons:

1. Patients limit the amount of weight placed through the operated limb depending on the stability of the construct, and failure rates are not increased with an immediate weight-bearing protocol even in unstable fracture patterns with traditional implants.
2. Modern technology and implants allow for stable fixation, or replacement. arthroplasty, in all cases of proximal femur fracture, including those previously considered biomechanically "unstable" after surgery with older implants such as the sliding hip screw.

There is no longer any reason for hip fracture patients to be subjected to limited weight-bearing after hip fracture surgery.

Further information is in the document "Surgery to Improve Function" in the Resource Folder.

Positioning

Based on the intended surgery a patient with a fractured hip will typically require some extreme positioning to enable clear access to the surgical site and maximize outcomes through accurate placement of the repairing technology.

Intraoperative injuries have a very negative impact on patient recovery and length of stay. These injuries can be short-term, i.e. a neuropathy that resolves in 24 - 48 hours or long-term, i.e. pressure ulcers or skin injuries. Risk factors for positioning injuries which have significant relevance for this group of patients include: length and type of procedure, patient's age, weight, and chronic illnesses. Some risk factors can be minimized with appropriate preoperative management i.e. nutritional status, co-morbidities, and preexisting pressure ulcers.

Operating room table mattresses and positioning devices should be pressure avoiding and protection devices must be used judiciously to protect but not harm. If the patient is identified

as at risk for skin breakdown at this time a pressure treatment surface should be arranged for the postoperative bed.

Normothermia

Maintaining normothermia during the perioperative journey is an important measure not only from a patient comfort perspective but to reduce negative postoperative factors associated with hypothermia. These include susceptibility to postoperative infection, reduced platelet function, and protein wasting. Frail elderly are extremely prone to hypothermia and care should be taken both preoperatively and intraoperatively to maintain normothermia.

Postoperative Pain Management

Analgesics are recommended for the first 72 hours postoperatively and thereafter as needed. Appropriate opioids include: hydromorphone, oxycodone, morphine (least preferred due to the morphine-6-glucuronide (M6G) metabolite). Multimodal analgesia concepts should be employed, such as co-administering acetaminophen up to a maximum dose of 4000 mg in 24 hours. The goal of pain management is to make the patient comfortable and promote activity and not to sedate the patient thereby reducing activity levels. Patient controlled analgesia (PCA) devices, which allow patients to self-administer intravenous opioids according to timed dose parameters set by a physician can be used however PCA devices may not be appropriate for patients suffering from delirium and/or dementia which can account to 60% of hip fracture patients. If PCAs are used it should be for short time with patients transitioned from intravenous to oral opioid medications when tolerated to encourage mobility.

In certain specialized cases, continuous regional anaesthesia (i.e. epidural) can be considered for postoperative analgesia. Postoperative epidural analgesia requires specific daily assessments and potential alterations in postoperative anticoagulation. Some anaesthesiologists abstain from the concurrent use of systemic opioids and intrathecal/epidural long-acting opioids (ie. morphine) because of the increased risk of respiratory depression.

Post- Anaesthetic Care Unit (PACU) Care

A standardized care plan should be developed for the immediate postoperative period for patients following a repair of their fractured hip. The care plans should be twofold, one for the patient whose surgery was under regional anaesthesia and one for those undergoing a general anaesthetic. Careful post anaesthesia care is essential to ensure safe recovery and readiness for discharge from the PACU to the surgical unit.

Recommended practice for the PACU will include:

- » Management of symptoms
- » Minimizing length of stay in the PACU
- » Discharge criteria
- » Family in PACU

Management of Symptoms

Care in the PACU will need to include careful management of postoperative pain, and minimizing potential risks including delirium.

The following fundamentals of PACU care need to be considered:

- › Airway management
- › Stabilization of the surgical site
- › Drainage from tubes/drains
- › Body temperature, hypothermia in particular
- › Intravenous fluids
- › Circulation/sensation in the extremity
- › Level of sensation after regional anaesthesia
- › Pain management
- › Nausea/vomiting

Length of Stay in PACU

The postoperative stay in the PACU is dependent of each individual patient's postoperative condition, co-morbidities, and type of anaesthesia. Typically, nurse-to-patient ratio is higher in the PACU than on a general surgical unit so each patient must reach a safe level of care before discharge. Alternately each patient will benefit from prompt unit transfer into a quiet environment with family support as soon as ready.

Discharge Criteria

Discharge from PACU is determined on reaching clinical criteria that will indicate the patient is ready for safe discharge and admission to the floor. Appropriate discharge criteria should be developed through best practice literature and discussion with patient care providers. Transfer to the unit should be supported through full communication of surgery and postoperative status. Immediate pain management processes and their continuance are a critical part of that communication.

Family Role in PACU

There may be instances where a family member should be permitted into the PACU to provide support to the patient in order to expedite the process of orientation to place and time.

Immediate Postoperative Care

Hip fracture surgery is a traumatic event in which the patient undergoes a complex surgical procedure to either repair or replace the hip. Follow up care with an early focus on maximizing mobility and recovery is therefore critical. The perioperative period is also a precarious time for older people with hip fractures. Age related organ decline and pre-existing conditions render them susceptible to postoperative complications. These patients often have co-morbid conditions such as malnutrition, heart failure, diabetes and chronic respiratory conditions and are frequently on multiple medications to manage these conditions. As such the focus of the post operative care must be to promote medical stability following the surgery, facilitate recovery through returning to activity including ambulation and the management of potential risk factors. This is particularly important through the first few days Day 1 – 7 post surgery where the patient's care and needs greatest and they are most vulnerable to complication.

This section provides information on the following areas that need to be considered in the post operative management of these patients:

- Consideration of care needs
 - » Home discharge philosophy
 - » Staffing
 - » Decision support tools
- Comprehensive care
 - » Medical Assessment and Intervention
 - » Social Assessment and Intervention
 - » Early mobility and function
 - » Patient and Family involvement
 - » Communication
- Prevention, Detection and Management of Risks
 - » Cardiac Instability
 - » Hypoxia
 - » Dehydration
 - » Electrolyte Disturbances
 - » Anemia
 - » Nutrition
 - » Constipation
 - » Wound
 - » Urinary Tract Infection (UTI)
 - » Pneumonia: Aspiration, Infectious, Atelectasis
 - » Post-operative Pain
 - » Prevention of Analgesic Adverse Effects: Sedation
 - » Venous Thrombo-embolism
 - » Pressure Ulcers
 - » Osteoporosis

- » Falls prevention “in Hospital”
- Dementia, delirium, depression (3D’s)

Consideration of care needs

Consideration needs to be given to the care needs of the patient. Although this is dependent on the resources and services that are available within the community the following needs to be considered:

- › Overall environment including levels of stimulation day and night
- › Availability of resources to mobilize the patient regularly
- › Accessibility of family members to stay with patients
- › Increased risk of complications
- › Need to access geriatric focused care

Through the immediate post operative care the physical and mental presentation of this patient population varies significantly therefore there will need to be access to different levels of care. During this time decisions also need to be made on how to meet the patient's longer term care needs as high functioning patients may respond well to care in an acute care unit however lower functioning patients may require longer periods of care with a transition to another unit.

For patients who live in a rural community and have been transferred out of area for their surgery, a transfer back to their local hospital should be considered as soon as the patient is medically stable to enhance linkages to family and community resources.

Home discharge philosophy

A safe discharge home is the goal of care for most hip fracture patients. Work toward this goal begins with educating the patient and family early about the optimal home environment, supports, how to foster health, and how to avoid readmissions. The frailty, comorbidity and cognitive impairment experienced by many hip fracture patients renders them susceptible to medical deterioration, complications and risks such as falls when they return home. For patients and families that choose to return home a successful discharge is dependent on the system having a supportive discharge philosophy of care, which includes:

- › Patient assessment by a person that is qualified and knowledgeable on community supports available
- › Communication with the team to identify and address risk issues

- › Transparent decision making processes for the patients and families including discussion of risk
- › Access to all the community supports that are available in the region
- › Discharge being supported by all staff who interact with the patient
- › A formal process through the team with no person being able to circumvent the discharge planning once agreed upon unless there is a change in the patients presentation.

Staffing

Hip fracture patients require care that includes geriatric and orthopaedic postoperative management by an interdisciplinary team. In addition to care provided by the orthopaedic surgeon, consistent skilled geriatric medical care is vital to the management of frail older people with hip fractures. The approach needs to be multidisciplinary and includes a role for all the health professionals.

Patients are often medically unstable in the first 72 hours following surgery and require care by nurses with high acuity skills working collaboratively with a designated surgeon, nurse practitioner or physician. Physiotherapists support the functional enhancement of the patient including maximizing mobility and staffing should be available seven days per week. Pharmacists provide vital support for medication reviews and reconciliation.

Occupational therapists provide support around, feeding/swallowing, positioning, skin protection, pain management and home preparation. A dietitian should be available for consultation related to malnutrition, special diets, and co-morbid conditions.

For this patient population frequent mobility, toileting and adequate nutrition are essential for recovery and are the responsibility of all the members of the health care team.

Some sites utilize case management roles to ensure that complex care needs involving multiple service providers are followed across the continuum.

Decision Support Tools

Care maps/clinical pathways are interdisciplinary documents that specify the clinical standards of care and guide appropriate care decisions and action. Variances to care and outcomes are charted in note form. Clinical pathways are effective in preventing complications and thereby enhancing recovery. It is recommended that pathways be used that explicitly address prevention, detection and management of risks and concerns for this population.

The use of other standardized tools where they are available is recommended including:

- › Geriatric medical assessment forms,

- › Medication reconciliation programs
- › Clinical assessment tools such as for pain management and dementia/delirium

Comprehensive Approach

The initial postoperative period of care (Day 1 – 5) for the hip fracture patient needs to focus on medical stabilization, mobilization to return to function and prevention of complications. Once the patient is medically stable, the return to activities of normal living and planning for a successful care transition to home needs to become the focus. However, there also needs to be the ongoing stabilization of co-morbid factors and prevention of complications including future fractures.

Medical Assessment and Intervention

Effective perioperative care begins with a thorough geriatric focused medical assessment and immediate stabilization of the patients medical condition including any co-morbid conditions.

Medical intervention needs to be designed to optimize the patient's medical conditions including the provision of medications to restore health and avoid future falls. The patient's primary diagnosis is hip fracture and this requires an active approach to care through a functional enhancement program. However the patients other medical conditions need to be optimized and any pre-existing condition or the adverse effects of medication that may have precipitated the fall that caused the hip fracture need to be addressed through the hospital stay. Ongoing medical management is required as the stress and pain of the fracture and surgical experience may further exacerbate a co-morbid illness.

Social Assessment and Care Planning

Social support and home environment concerns are common and may impede timely hospital discharge and pose risks for readmission. For example, the patient may reside with a frail older spouse who also has health challenges. The family may not be readily available due to work commitments and caring for children. The family may not feel competent to manage the health and mobility concerns of the patient or the patient may live alone without access to home supports. Additional concerns are whether the home environment may have barriers to mobility and fall hazards. These concerns need to be assessed and identified early so that an appropriate care plan can be designed and implemented.

Information on the patient's social status is required for care planning. Many patients will be able to return home, or to an alternate living arrangement such as a long term care home as soon as they are medically stable. For the majority of patients this medical stability can be achieved within 5 days and the ongoing medical and functional recovery needs of the patient can be coordinated in the community. For other patients a more thorough social assessment will be required including obtaining information from the patient and their families. Through

these interviews patients who will be unable to manage at home and the need for transition to an alternative living setting will be identified. However, for the majority of patient, there will be a wish and opportunity to return to their pre living arrangement of home. In this case a thorough review of the activities of daily living and social supports needs to be completed and the patients care planning needs to be focused on these activities.

There is a Model of Accountable Care (MAC) which is available in the Resource Folder which guides teams to explicate foreseeable risks and concerns and uses decision support tools to prevent, detect, manage and evaluate these risks / concerns. MAC is predicated on the belief that if a risk is foreseeable, healthcare providers are accountable to prevent or reduce its impact on the patient and the system. Ongoing planning with the patient and family needs to occur throughout the patients stay with the focus of returning home.

Early Mobility and Function

Bed rest and lack of mobility results in the loss of muscle and bone mass. This patient population may have been unable to ambulate for a period of time as they waited for their surgery and as such mobilization and the facilitation of activity levels is crucial to their recovery. As such, the following needs to be considered:

- › Patients should be mobilized as soon as medically stable (i.e. within 12-24 hours of surgery).
- › Mobility can start with sitting / dangling in very frail patients but should progress to standing within 24 hours of surgery.
- › Weight-bearing status should be 'as tolerated'; if not, discuss with surgeon regarding ambulation prognosis
- › Ambulation aids should be assessed and their use taught. Patients who are safe to ambulate with the aid independently should have access to the aid to promote independence.
- › Ambulation status should be posted at the patient's bedside (such as in a white board) to ensure all staff are able to mobilize the patient appropriately.
- › Patients should receive at least daily physical and occupational therapy including week-ends regardless of cognitive status.
- › Rehabilitation sessions should focus on gait quality, walking endurance, transfers, activities of daily living and safety.
- › Treatment goals should progress the patient's ambulation, transfer, and activities of

- daily living status. These goals should be set daily based on their pre-fracture capacity.
- › Patients should be up in a chair for meals whenever possible and should spend as much of the day as tolerated out of bed to encourage cognitive alertness and promote activity and independent self-care.
 - › Independence in self-care and hygiene should be encouraged to the degree possible with assistance provided as necessary. All care staff should be involved in encouraging mobility/independence in toileting and transfers, not just rehabilitation specialists.
 - › A high protein diet and adequate hydration should be encouraged so that patients can participate in functional activity to optimize recovery.
 - › Treatment sessions and pain management should be coordinated to maximize the patient's ability to participate in rehabilitation.
 - › Pain should be assessed regularly in all patients, including those who cannot communicate verbally (use of non-verbal pain scales is encouraged), to ensure pain is consistently controlled.
 - › There should be daily assessments of a patient's progress to determine needs for post-acute functional recovery and to prevent delays in transfers to rehabilitation, home, or other care environments.
 - › Functional assessments done at 2 days postoperatively using standardized tools may assist in determining appropriate discharge destinations.
 - › Discussions should commence with transfer facility and should involve patients and their families to prevent delays and facilitate communication among care providers.

Patient and Family Involvement

Recent clinical investigations identified value in including the patient and their family in the care pathway. The only consistent part of the continuum of care is the patient and their family. Therefore, recovery can be predicated on the knowledge and support of the patient and their family to recover and eventually return to their original home setting. This subject will be discussed at length later in this document.

Communication

Team

Communication between team members is crucial to track patient progress and facilitate planning for recovery and eventual discharge. Some of the communication strategies that can be considered to facilitate communication within the interdisciplinary team are:

- › Standardized care pathways
- › team shared patient charts

- › check lists
- › patient white boards
- › designated discharge dates on admission to the floor

Patient

Effective communication with the patient is important to ensure their understanding of the recovery process. There are many potential limitations to effective communication which include the patient's ability to see and hear. It is therefore essential that patients are provided with their eye wear, such as glasses, as well as their hearing aids. If any additional limitations are identified by the team, strategies need to be developed to ensure patients understanding and facilitate their participation in their recovery process.

Prevention, Detection and Management of Risks in the Immediate Postoperative Period

In combination with the fracture healing, age-related changes, the stress of the fracture, hospitalization and pre-existing co-morbidities can predispose patients to serious problems in acute care. These problems are most relevant in the first 5 days post operatively and may include: delirium, hypoxia, dehydration, heart failure, pneumonia, urinary tract infection, malnutrition, unmanaged pain, skin breakdown, over sedation, and insomnia. Depression, morbidity, delayed recovery and even death can result with these problems. They are often foreseeable and preventable, and if detected early, will resolve with appropriate management.

The following provides an overview of risks with strategies for prevention, detection and management. In the discussion below, the term most responsible physician and medicine are used acknowledging that there may be alternate professionals such as a nurse practitioner who is assigned to follow the patient.

Cardiac Instability

Pain, physical and psychological trauma associated with hip fracture will stress the diminished cardiac and respiratory systems of a frail older adult. Postoperative heart failure is a common complication with cardiac instability.

- › **Prevention/Detection/Management:** Use current heart failure evidence-based guidelines to diagnose, identify and manage underlying causes..
- › Identify patients at risk or those who have pre-existing heart failure.
- › Carefully select, monitor and titrate intravenous fluids in accordance with guidelines.

- › Monitor and report to medicine:
 - › Abnormal vital signs: increased heart rate and blood pressure
 - › Signs of heart failure: diminished breath sounds, crackles, ankle swelling, ascites, and coughing.
 - › Symptoms of heart failure: patients may complain of shortness of breath or chest tightness.

Hypoxia

Hypoxia is common due to age-related reductions in pulmonary capacity, pre-existing respiratory conditions such as asthma, COPD, pneumonia, and medications such as anaesthetic agents, analgesics and other sedating agents.

- › **Detection:** Monitor and document pulse oximetry and vital signs. Report abnormal findings to the most responsible physician and document resolution.
- › **Prevention/management:** Identify and address underlying causes. Apply oxygen to maintain O₂ saturation at 92% or higher or as specified appropriate if patient has COPD.

Dehydration

Dehydration is common due to fasting prior to surgery, as well as the pre-surgical nutritional status of the patient. Adequate hydration is necessary for cell functioning and can contribute to delirium.

- › **Detection:** Monitor: high urea to creatinine ratio, elevated hematocrit; fluid balance values and variances at the end of every shift; symptoms: concentrated urine, dry mucous membranes, diminished skin turgor. Report concerns to most responsible physician and provide fluids.
- › **Prevention/Management:** Avoid unnecessary fasting (clear fluids 2 hours preoperatively, full fluids 6 hours preoperatively), intravenous replacement as indicated with recommended solution, oral intake goal of 1500 ml per 24 hours, unless fluid restriction, monitor and ensure the ingestion of sufficient fluid, urine output should be at least 30 ml/hour.

Fluid Overload

Patients with heart failure; diminished renal function, and rapid intravenous infusions are predisposed to fluid overload.

- › **Detection:** Monitor and report to most responsible medical physician decreased urine output, and diminished breath sounds and crackles.

Electrolyte Disturbances

Electrolyte disturbances are common due to diminished renal function, prolonged fasting, intravenous infusions, vomiting and diarrhea and can contribute to cardiac problems if not addressed in a timely manner.

- › **Detection:** Monitor laboratory values and report abnormalities to medicine and document the outcome of the treatment.
- › **Prevention/management:** Monitor/adjust medications and intravenous solutions according to the patient's condition ensuring accurate fluid balance record is maintained and issues addressed in a timely manner and documented. Review and address the underlying cause of vomiting and diarrhea. Use anti-emetics sparingly to prevent vomiting where necessary.

Anaemia

Pre-existing anaemia is common due to chronic illness or insufficient diet. Blood loss may result from the fracture and the surgery, and bleeding risk is increased with anticoagulant medication. Anaemia will increase cardiac workload and could lead to a myocardial infarct if there is a preexisting cardiac condition.

- › **Detection:** Monitor hemoglobin and signs of anaemia and document. Hemoglobin under 90 g/L should be reported to most responsible medical physician and the outcome documented.
- › **Symptoms:** Dizziness, weakness, nausea, fainting, tachycardia, shortness of breath, paleness of skin, and chest pain.
- › **Management:** Prescribe/administer blood products as per evidence-based guidelines. Include an iron rich diet and provide oxygen as ordered. . Supplements are not recommended.

Nutrition

Co-existing malnutrition is highly prevalent in this population due to diminished hunger and thirst, certain chronic illnesses, dentition, and social isolation. Malnutrition risks may be compounded in hospital due to fasting prior to surgery, sedation, postoperative nausea, constipation, inability to self-feed and the palatability of hospital food. Malnutrition is associated with the inability to mobilize, increased infection risk, skin breakdown and failure to heal. Dietary consultation and assessment by a registered dietitian is recommended if malnutrition is suspected either in hospital or after discharge into the community (i.e. BMI < 20; albumin below normal range).

- › **Detection:** Assess albumin level on admission. Observe physical appearance: lack of body fat, dry skin, diminished skin turgor. Record percentage of meal consumed at each meal.
- › **Prevention/management:** Minimize NPO times and move to a solid diet as soon as tolerated. High calorie, high protein diets with daily nutritional supplements are recommended. It is essential that staff provide meal support or feeding to ensure adequate intake. Consult a dietician if the patient is malnourished and unable to maintain adequate intake. A temporary feeding tube should be considered if the patient is unable to take in food orally.

Constipation

Constipation is almost a certainty due to age-related slow motility, dehydration, immobility, opioid use, and dietary changes. The consequences of constipation include: abdominal and rectal pain, nausea and vomiting, bowel obstruction, agitation, and delirium.

- › **Prevention:** Implement evidence-based prevention of constipation best practice bowel protocol including pre-emptive laxatives and a high fibre diet. Ensure intake of a minimum of 1500 mls oral fluid daily, regular mobilization including a toileting schedule, regular mobilizing up to commode or toilet, no bedpans and progressive mobilization. Determine strategies employed by the patient at home and include in the care plan where appropriate.
- › **Detection:** Record bowel movement frequency / type and size daily.
- › **Management:** If no adequate bowel movement within three days, progress bowel protocol to suppositories or enema. Notify most responsible physician if interventions are ineffective.

Pressure Ulcers

Patients with hip fracture are at high risk for pressure ulcers due to immobility, advanced age, anaemia and malnutrition. Pressure ulcers cause pain and disability and prolong the hospital stay. Braden scores must be done on admission and every 72 hours thereafter. Should a pressure sore be observed, daily Braden scores are to be performed. Techniques to alleviate pressure ulcers include: providing a bed with an air mattress, turning the patient every 2 hours, following good skin care, and providing fluids.

- › **Detection:** Inspect and record condition of pressure points, perineum, and general skin condition on admission and at least twice daily. Conduct a formal pressure area risk assessment such as the Braden Scale on admission and at least every three days until the patient is fully mobile.

- › **Prevention:** As per best practice guidelines for the assessment and prevention of pressure ulcers (Braden Scale) pro-actively address risks noted in the assessment. Ensure regular repositioning and early, frequent mobility. Stretchers and beds should have a pressure reduced surface from admission, to emergency, in transit, in the operating room, and on the patient care unit. Consider using heel protective devices.
- › **Management:** Follow current evidence-based guidelines for treatment of wounds. Refer to wound specialist if required.

Nausea and Vomiting

Postoperative nausea and vomiting are relatively common in the general population however are uncommon in frail older patients. If it occurs there needs to be consideration of alternate reasons such as constipation, other medications or gastrointestinal disturbances. If an anti-emetic is required, ondansetron is the first choice for anaesthetic or opioid induced nausea and use a low dose for the shortest possible time. Avoid anticholinergic medications such as dimenhydrinate.

Anxiety Distress

Anxiety and distress are common due to the catastrophic nature of the hip fracture and what it means to the person and family in the future. The hospital experience, procedures and pain can add to the distress. Anxiety can be associated with cardiac arrhythmias, insomnia, and increased pain.

- › **Detection:** Assess patient's preadmission coping skills and key concerns, and re-evaluate again in the emergency room.
- › **Prevention/ Management:** Provide standardized education, support and coaching to the patient and caregiver on:
 - › The hip fracture injury and surgical repair.
 - › What to expect during the hospital stay.
 - › Their role in recovery: turning, mobilizing, pain management, venous thromboembolism prophylaxis, and infection prevention.
 - › Expected length of stay in acute care and what is next e.g. home with supports, inpatient rehabilitation etc.

- › Their role in preparing to go home: preparing home supports provided/ available, identifying red flags and what to do, medication, reconciliation, and follow-up required (e.g. with family physician).
- › Consult social work and or community agency as indicated.

Wound Infection

Follow Safer Health Care Now Guidelines for prophylactic antibiotic management. Monitor wound for signs and symptoms of infection. Report to most responsible physician as indicated

Urinary Tract Infection

Hip fracture patients are at high risk for a urinary tract infection (UTI) due to the presence of pre-existing co-morbidities, advanced age, and malnourishment. Insertion of an indwelling catheter increases the risk for a catheter associated urinary tract infection (CAUTI)

- › **Prevention/detection:** A urinalysis should be done on admission. Observe and report symptomatic urinary tract infection guidelines (CDC Criteria 2009) to most responsible physician. Avoid use of a Foley catheter, or use only short term, i.e., remove by end of postoperative Day 1. Standard use of evidence-based CAUTI strategies is recommended. Patients need to be monitored to ensure adequate hydration, as well as good perineal and catheter hygiene for the duration the catheter is in situ.
- › **Treatment:** Follow current evidence-based urinary tract infection guidelines (link to guidelines).

Pneumonia: Aspiration, Infections, Atelectasis

Hip fracture patients are also at high risk due for pulmonary complications due to advanced age, immobility, co-morbid conditions, anaesthetics, opioids and sedating medications, and poor oral hygiene.

- › **Prevention:**
Aspiration: Implement a routine swallowing assessment; feeding precautions if warranted (e.g. up in chair, patient awake etc.) and control the spread of infections through hand washing and mouth care.
Atelectasis: Deep breathing and coughing 10 times per hour, frequent repositioning or up walking at least twice per day.
- › **Detection:** Monitor pulmonary function through a respiratory assessment, complete blood count (CBC), and chest X-ray.

- › **Management:** Follow current evidence-based guidelines for pneumonia management.

Unmanaged Pain

Patients with hip fractures are at high risk for inadequate pain management due to under-reporting and failure to detect pain especially among cognitively impaired patients. Adverse consequences include: delirium, deconditioning, pneumonia, cardiovascular complications, slow gastrointestinal function, hyperglycaemia, insomnia, blunted appetite, and depression.

- › **Detection:** Monitoring unmanaged pain requires frequent multi-dimensional pain assessment using evidence-based tools. A multi-dimensional pain assessment includes: the onset and duration of pain, location of pain, predisposing factors, pain quality (identify neuropathic pain versus incisional pain), treatment strategies/effectiveness, and history of regular opioid use. Screening for other causes of pain and past treatment is an important component of the medical history.

Personal beliefs, myths and misconceptions that influence pain management need to be identified and addressed. Use a validated pain rating scale for the elderly. Among cognitively impaired patients who cannot express themselves verbally the use of non-verbal pain scales is recommended.

Depression is common with chronic illness and will impact pain management. Assess for depression using a valid tool if patient presentation warrants. (See depression and sleep sections)

Identify and refer complex patients to a pain specialist when regular opioid use at home, moderate to severe pain for one month or longer at home, and neuropathic pain are reported.

- › **Prevention/Management:** Non-drug strategies are effective and may reduce analgesic requirements (e.g. warm blankets, ice packs to the incision area, gentle touch /massage, relaxation breathing).

Analgesics: The general rule in analgesic dosing in older patients is to ‘start low and go slow’; typically the starting dose should be 25 to 50 percent lower than the usual adult starting dose. Individualization of dose and medication is essential as organ function varies widely, and there may be potential tolerance to opioids if there has been regular preadmission use. Co-existing neuropathic pain requires specialized medications e.g. gabapentin, tricyclic antidepressants. The goal of pain management is to maximize function. The least invasive and safest method that can relieve pain is recommended. The oral route is generally

well tolerated and convenient. Transition from intravenous to oral analgesics should occur as soon as the patient can tolerate oral fluids. Once pain control is achieved, eliminate lines and devices that may impede mobility and use the oral route for analgesia when possible.

Multi-modal analgesia is recommended for hip fracture pain including:

1. Regular low dose opioids for the first 72 hours postoperatively, then as needed. Appropriate opioids include: hydromorphone, oxycodone, and morphine (least preferred due to M6G metabolite).
2. Regular acetaminophen to a maximum dose of 4000 mg in 24 hours.

Non-steroidal anti-inflammatory drugs (NSAIDS) are effective analgesics, that divide into two groups: non-selective or traditional (e.g. diclofenac, indomethacin, ibuprofen, ketolorac, naproxen etc) and newer selective agents known as Coxibs or COX-2 Inhibitors 2 (ie. celecoxib). Frail older adults are highly susceptible to the adverse effects of NSAIDS including renal failure, gastro-intestinal bleeding, and congestive heart failure. NSAIDS should not be used if the patient has heart failure, cardiovascular disease, dehydration, diminished renal function, or a history of gastrointestinal bleeding, which are prevalent concerns in this population. These medications are also contraindicated if the patient is on anticoagulants. Selective NSAIDS, e.g. Celebrex, have a lower incidence of gastrointestinal side effects and less interference with platelets and should be considered first. Ibuprofen and naproxen are the preferred choices in the non-selective NSAID group. The surgeon may also request NSAIDs are not used related to their potential affects on bone healing.

Evaluate the effectiveness of analgesia and titrate as required, carefully monitor sedation and respiratory status. Patients should be able to reposition and mobilize without severe pain.

Prevention of Opioid Adverse Effects: Common adverse effects of opioids in hip fracture patients are constipation, nausea sedation, respiratory depression, and delirium. A preventive approach is advised.

Constipation: The most common side effect of opioid analgesics is constipation. Prophylactic administration of laxatives is advised while the patient is on frequent dosing of opioids. (See Constipation section).

Sedation/ respiratory Depression

Sedation and respiratory depression risk can increase due to diminished renal and hepatic function resulting in accumulation of analgesic or psychoactive medications.

- › **Detection/ prevention:** Monitor sedation scale and respiratory rate at regular intervals and after each analgesic dose. Start with a low dose of analgesic and titrate to effect.
- › **Management:** Reduce or withhold dose as warranted by sedation level. Implement standardized Narcan protocol for over sedation.

Venous Thrombo-embolism

Among the variety of patients that are in hospital, hip fracture patients are one of the highest risk groups for developing a venous thromboembolism (VTE). These thromboembolic events occur both while the patient is in hospital and in the first few months after surgery.

- › **Prevention:** To prevent VTEs use evidence-based chemotherapy and mechanical prophylaxis as per the guidelines noted below. Early and frequent mobility and adequate hydration are recommended.
- › **Detection:** Monitor and report: vein related pain/tenderness, redness and excessive leg swelling. Monitor for symptoms of pulmonary embolism.
- › **Management:** There are a number of options for postoperative thromboprophylaxis:
 1. A low molecular weight heparin (LMWH) at doses recommended in the product monographs for orthopaedic surgery or one of the doses below:
 - › *dalteparin* (Fragmin®) 2,500 or 5,000 units subcutaneously once daily.
 - › *enoxaparin* (Lovenox®) 40 mg SC once daily or 30 mg subcutaneously twice daily.
 - › *tinzaparin* (Innohep®) 3,500 or 4,500 aXa units subcutaneously once daily.
 2. Fondaparinux (Arixtra®) 2.5 mg subcutaneously once daily.
 3. Heparin 5,000 units subcutaneously twice or three times daily.
 4. Warfarin with a target INR of 2.5 (range 2.0-3.0) - selecting this option implies that careful supervision of this drug will be implemented and maintained for the duration of thromboprophylaxis.

There are a number of additional considerations including:

To ensure that primary hemostasis has taken place it is reasonable to delay the start of postoperative thromboprophylaxis until the morning of the day after surgery (i.e. within 24 hours of surgery).

If the patient is to restart warfarin postoperatively, it can be started on the day after surgery if there are no bleeding concerns, generally with overlap using one of the LMWH or unfractionated heparin medications above until the INR is >2.0.

If the patient is to restart dabigatran postoperatively, it can be started on Day 3-5 after surgery if there are no bleeding concerns, generally with overlap using one of the LMWH or unfractionated heparin above until the dabigatran starts.

Duration of Thromboprophylaxis in Hip Fracture Patients

There is strong evidence that hip fracture surgery patients benefit from extended thromboprophylaxis. The optimal duration of prophylaxis between 2 and 6 weeks is not known. However, it is reasonable that this duration should be at least 2 weeks after surgery irrespective of whether the patient returns to home, goes to rehabilitation, or a long-term care facility. If the patient remains in hospital or rehabilitation longer prophylaxis can be considered...

Osteoporosis

Fragility fractures are the consequence of osteoporosis and represent 80% of all fractures in those over 50 years of age. A hip fracture places these patients at the highest risk for recurrent fractures. One in 3 hip fracture patients sustain another fracture within the first year of which many involve the contralateral hip; and, over 1 in 2 patients will suffer another fracture within 5 years. To prevent the next fracture it is therefore critical that these patients be identified as high risk, and that appropriate management for the underlying osteoporosis, diagnosis, correction of risk factors for falls/fracture, and treatment with a first line agent be instituted. This comprehensive approach requires consultation with a dedicated specialist in osteoporosis who is responsible for coordinating the care. The following recommendations for the management of this population are based on the 2010 Clinical Practice Guidelines for the Diagnosis and Management of Osteoporosis (<http://www.cmaj.ca/cgi/rapidpdf/cmaj.100771v1>).

Initiate an osteoporosis assessment: In-hospital consultation by an identified dedicated specialist in osteoporosis such as an orthopaedic surgeon, internal medicine specialist, geriatrician, endocrinologist, rheumatologist, or family physician.

- › Counselling on fall prevention and lifestyle modification to reduce fall risks (See Fall Prevention section.)
- › Provide nutritional counselling: Ensure an appropriate intake of protein and calcium. Dietary calcium intake is preferred. If dietary intake is insufficient, calcium supplementation to reach 1200 mg/day from diet and supplements combined is recommended.

- › Address vitamin D insufficiency: Most patients presenting with a hip fracture have sub-optimal vitamin D status. Vitamin D supplementation should be initiated and taken for 2-4 weeks before starting pharmacologic treatment. (See Vitamin D section)
- › Consider pharmacologic treatment in previously untreated patients: The goal of treatment post fracture is to reduce the risk of re-fracture. First line therapies with proven hip fracture reduction benefits are : alendronate, denosumab, risedronate, , zoledronic acid. Treatment should be initiated prior to discharge from hospital if possible. If the patient is discharged from hospital before pharmacologic treatment can be initiated then a prescription should be provided at the time of discharge with treatment initiated 2-4 weeks after starting vitamin D supplementation.
- › Continue pharmacologic treatment in previously treated patients: Should a patient already be on medication, it is important that it be continued or changed to another first line treatment for fracture prevention. This should be done in consultation with the treating physician or a specialist in bone metabolism. (2010 Clinical Practice Guidelines for the Diagnosis and Management of Osteoporosis: <http://www.cmaj.ca/cgi/rapidpdf/cmaj.100771v1>)
- › Do not delay treatment initiation in order to obtain bone mineral density (BMD) results: Fragility hip fractures represent a high risk for re-fracture, irrespective of bone mineral density results, and clinical trials show that empirical treatment is beneficial. The results of BMD testing are not required for the initiation of treatment, but may have value for monitoring response and should be recommended in the discharge summary.
- › Communicate the treatment plan with the family physician: The discharge summary must include a detailed summary of above, and must be forwarded to the family physician to ensure continued management. There must be clear transfer of ownership for the osteoporosis and post fracture management to ensure ongoing care as it is critical that patients are taking the appropriate medications correctly (Osteoporosis Canada Order Sets: Osteoporosis and Fragility Fracture Management Order Set and Family Physician Information Form).

Vitamin D

Vitamin D deficiency is associated with low BMD, a key risk factor for osteoporotic fractures, while vitamin D supplementation in adequately dosed randomized trials have shown a reduction in fractures. Vitamin D may also reduce falls through improvement in muscle strength and lower extremity function. In conjunction with adequate calcium intake, vitamin D sufficiency is important for achieving optimal pharmacologic treatment benefit. The following recommen-

dations are based on the 2010 Clinical Practice Guidelines for the Diagnosis and Management of Osteoporosis (<http://www.cmaj.ca/cgi/rapidpdf/cmaj.100771v1>).

- › Patients with a hip fracture should be assumed to be vitamin D insufficient and receive vitamin D supplementation.
- › A single loading dose of vitamin D 50,000 IU followed by a maintenance dose of Vitamin D3 800 – 2000 IU/day should be initiated as soon as the post operative condition permits
- › Serum 25-hydroxyvitamin D level should be assessed after 3-4 months of adequate supplementation and should not be repeated if an optimal level (75 nmol/L or greater) is achieved.

Fall Prevention in Hospital

Following a hip fracture patients are at a significant risk of falling and are often fearful of falling again. They may therefore resist mobilization or unnecessarily restrict activities important to their quality of life and optimal function during their hospital stay. Strategies to maximize the patient's recovery through ambulation must take these factors into consideration and minimize the risk (See Fall Prevention section).

Dementia, Delirium, Depression (3 D's) in Hip Fracture Care

Delirium, dementia and depression (the 3 D's) are significant issues for hip fracture patients. These people are often older with complex medical issues which contribute to the 3 D's being unrecognized, occurring frequently, and often being poorly managed. The 3 D's are not a normal part of aging and often need to be considered together because many of the symptoms and behaviours often co-occur making it difficult to recognize the differences between them. They are thought to significantly influence rehabilitation gains and are known to affect length of stay in hospital and discharge disposition.

Delirium

Hip fracture patients are at high risk for delirium preoperatively, while at the same time about 17% of hip fracture patients enter the hospitals with a known diagnosis of dementia. In addition, a significant unknown number of patients have cognitive deficits that are unmasked at the time of fracture.

- › Delirium is present in up to 65% of hip fracture cases and is frequently underappreciated in its clinical consequences.
- › Is usually caused by multiple co-occurring precipitants and therefore requires a comprehensive medical assessment that includes history review, physical examination and investigations.

- › Is not always reversible, even after the underlying precipitants have been corrected, therefore delirium prevention should be a priority.
- › Events occurring in hospital that can increase a patient's risk for developing postoperative delirium include the use of physical restraints, inappropriate use of medications, use of in-dwelling urinary catheters, inadequate nutrition and iatrogenic complications.
- › Contributes to mortality and postoperative complications including functional decline, increased length of hospital stay and early transition into long-term care.
- › Prevention and management through a comprehensive standardized protocol can reduce delirium in one-third and severe delirium in one-half of cases.
- › Multi-component preventative strategies have been shown in randomized controlled trials to prevent 1 case of delirium for every 7 patients treated with such a strategy.

Dementia

Dementia is a syndrome of progressive decline in multiple areas of cognitive function. Diagnosis must include memory impairment and at least one of:

- › Aphasia (language problem)
- › Apraxia (impaired ability to do purposeful movements)
- › Agnosia (failure to recognize or identify objects)
- › Executive Function Disturbance (abstract thoughts, plan, initiate, sequence, monitor)

Deficits must eventually lead to a significant inability to maintain occupational and social performance. The estimates of the prevalence of dementia range from 2.4 % among persons aged 65-74 years, to 34.5 percent among those aged 85 and over.

- › Occurs frequently amongst patients that come from community living situations (17% of patients), and many are diagnosed after admission to hospital.
- › Dementia is the leading risk factor for delirium, and is underlying in two thirds of delirium cases.
- › Dementia significantly reduces a patient's opportunity for rehabilitation with

many healthcare programs restricting access related to the perception that the cognitive and behavioral symptoms of dementia influence the healthcare professionals' ability to effectively deliver care.

- › Relational and environmental approaches are effective in influencing and modifying cognitive and behavioural issues; healthcare professionals can successfully care for these patients after learning the knowledge base and clinical skills to assess and treat dementia.

Dementia and Behavioral Symptom Management

Behavioral symptoms are often prevalent among patients with dementia and at times those experiencing delirium. These symptoms are significant factors for hip fracture patients with dementia seeking rehabilitation and are often perceived to influence health care professionals' abilities to effectively deliver care. Specifically, the symptoms of anxiety, agitation and irritability are perceived to most likely interfere with rehabilitation. These symptoms can be observed as common behaviors such as:

- › Inability to concentrate or perform a simple task
- › Agitation
- › Withdrawal
- › Inappropriate social behaviors
- › Aggression/ Resistance during care
- › Sundowning
- › Catastrophic reactions
- › Delusions, paranoia, hallucinations
- › Wandering, risk for elopement
- › Calling out/ Repeated questioning

Strategies to effectively manage behavioural symptoms are based on health professionals having the knowledge and skills to understand and manage these behaviors. Strong bio-psycho-social assessment skills such as those found in Antecedent/Behavior/Consequence approaches are useful to identify triggers and risk to behaviors, and through emergent patterns identify underlying problems and actions for correction. Awareness of effective interventions for use by health care professionals including relational and environmental approaches can influence and modify behavioural issues. Six groups of non-pharmacological interventions are useful and include:

- › Use relational approaches including effective communication skills
- › Adjust daily routines to focus on the person not the task
- › Adjust the environment
- › Use structured activities

- › Establish continuity
- › Invite family involvement

With the use of the appropriate knowledge and skills to manage behavioral symptoms, health care professionals can successfully care for these patients in rehabilitation.

Medication management should only be considered for acute and high risk behaviors that cannot be managed through other behavioural management strategies. Medications may be required for short term management using an antipsychotic or benzodiazepine. Options for prevention and/or medium to long-term management may include cholinesterase inhibitors, memantine, and/or SSRI antidepressants.

Depression

Depression occurs in 10-30% of hospitalized older persons and is frequently mis-diagnosed, under-diagnosed and missed all together. This can slow the recovery process.

Symptoms of depression amongst older persons are unique with complaints that often focus on somatic symptoms. Since patients often demonstrate an inability to concentrate, they can present as if they have memory impairment or cognitive dysfunction.

Early detection through screening is important to differentiate depression from cognitive decline through delirium and dementia. It is difficult to diagnose depression in the setting of delirium and therefore requires that the delirium be addressed first. Appropriate management of depression can lead to improved clinical outcomes and shorter lengths of stay.

- › **Detection:**
Assessment of premorbid functioning and any previous diagnosis of dementia.

Assessment should routinely occur on every shift using standardized assessment tools for delirium screening such as the Confusion Assessment Method (CAM). In some cases, The Dementia Quick Screen may be helpful to identify the existence of cognitive impairments in the emergency room.

Assessment of underlying causes of delirium may include B12, thyroid stimulating hormone (TSH), complete blood count (CBC), glucose, blood urea nitrogen, creatinine, and electrolytes (GBCL), and liver profile.

In particular, the effectiveness of pain management requires regular assessment and use of standardized pain assessment tools.

› **Prevention and Management:**

Reduce delirium frequency and complications through a review of risk factors

Regular (at least every shift) assessment of symptoms using a delirium screening tool such as the Confusion Assessment Method (CAM)

Delirium prevention and intervention protocols which have been found to reduce frequency and complications should be implemented and include:

- › Orientation protocols (daily and as needed),
- › Early mobilization and encouragement of independence in activities of daily living,
- › Optimizing nutrition including appropriate assistance and positioning
- › Avoidance of medications with high anticholinergics and/or sedating properties
- › Non-pharmacological approaches to minimize the use of psychoactive drugs (e.g. benzodiazepines, antipsychotics)
- › Optimal pain management with consideration for the use of regularly dosed acetaminophen and initiation of low dose narcotics as needed (avoiding meperidine),
- › Avoidance of physical restraints
- › Early removal of urinary catheters postoperatively and initiation of toileting protocols if incontinence is an issue,
- › Sleep hygiene using non-pharmacological interventions (e.g. warm milk; warm blankets; hand massages; low light; minimal noise and interruptions through the night),
- › Adaptive equipment for vision and hearing impairment,
- › Restoration of serum electrolyte abnormalities, and
- › Early intervention for volume depletion or overload.

Proactive approaches using geriatric principles and where necessary, geriatric consultation, may reduce incidence and severity of delirium, and improve man-

agement of dementia in patients undergoing surgery for hip fracture.

Use of medication may be considered for some patients when experiencing only severe symptoms of delirium (e.g. disturbing hallucinations; aggressive behavior that is not manageable using non-pharmacological strategies) or behavioral issues of dementia. Low dose anti-psychotics are typically suggested as first line (assuming no contraindications).

Delirium algorithms should be effectively used to assist healthcare practitioners in effective detection, prevention and management of delirium for hip fracture patients including the regional geriatric program of Ontario – Geriatric Interprofessional Practice and Interorganizational Collaboration (GIIC); Vancouver Island Health Authority.

Patient/family education resources help to improve understanding and provide direction about caring for people experiencing the 3D's.

Postoperative Management of the 3Ds

Postoperative management of the 3Ds is essential for the hip fracture patient. These challenging issues require a multidisciplinary approach that includes targeted nursing and rehabilitation assessment and interventions to manage these cognitive issues on a daily basis. In severe cases, pharmacological management through either the surgeon or another physician is recommended.

› **Detection:**

Building on the patient data gathered in the emergency department, patient/family assessment of premorbid functioning and any previous diagnosis of dementia. Social work/other assessment is recommended on Day 1-2 postoperatively.

Assessment should occur routinely every shift using standardized assessment tools for delirium screening such as the Confusion Assessment Method (CAM).

Assessment using standardized assessment tools for dementia using the Dementia Quick Screen, and in most cases the Mini-Mental State Examination (MMSE) and/or MOCHA, should occur by Day 3 postoperatively to identify underlying cognitive impairments and determine baseline cognitive status.

Assessment using standardized assessment tools for depression such as the Geriatric Depression Scale, should be considered for patients presenting with symptoms of depression

Assessment of underlying causes of delirium may include B12, thyroid stimulating hormone (TSH), complete blood count (CBC), GBCL, and liver profile.

Regular assessment using standardized assessment tools will monitor the effectiveness of pain management and the implementation of standardized assessment tools should include those for patient with delirium/ dementia.

Prevention and Management:

Reduce delirium frequency and complications through a review of risk factors,

Regular (at least every shift) assessment of symptoms using a delirium screening tool such as the Confusion Assessment Method (CAM)

Delirium prevention and intervention protocols which have been found to reduce frequency and complications should be implemented and include:

- › Orientation protocols (daily and as needed),
- › Early mobilization and encouragement of independence in activities of daily living,
- › Optimizing nutrition including appropriate assistance and positioning
- › Avoidance of medications with high anticholinergics and/or sedating properties
- › Non-pharmacological approaches to minimize the use of psychoactive drugs (e.g. benzodiazepines, antipsychotics)
- › Optimal pain management with consideration for the use of regularly dosed acetaminophen and initiation of low dose narcotics as appropriate (i.e. avoiding meperidine),
- › Avoidance of physical restraints
- › Early removal of urinary catheters postoperatively and initiation of toileting protocols if incontinence is an issue.
- › Sleep hygiene using non-pharmacological interventions (e.g. warm milk; warm blankets; hand massages; low light; minimal noise and interruptions through the night),
- › Adaptive equipment for vision and hearing impairment,
- › Restoration of serum electrolyte abnormalities, and

Early intervention for volume depletion or overload.

Proactive approaches using geriatric principles and where necessary, geriatric consultation, may reduce incidence and severity of delirium, and improve management of dementia in patients undergoing surgery for hip fracture.

Use of medication may be considered for some patients when experiencing severe symptoms of delirium, behavioral issues of dementia, depressive symptoms that cannot be managed through non medication strategies.

Delirium algorithms should be effectively used to assist healthcare practitioners in effective detection, prevention and management of delirium for hip fracture patients including the regional geriatric program of Ontario: the Geriatric Inter-professional Practice and Interorganizational Collaboration (GIIC); Vancouver Island Health Authority.

Referrals to geriatric/dementia resources should be considered with planning, including Alzheimer Society; memory clinics; geriatric and psychogeriatric services; day hospital. Patient/family education resources help to improve understanding and provide direction about caring for people experiencing the 3D's. Education for healthcare practitioners about the 3D's is required to develop the knowledge, skills and judgment to effectively practice and care for hip fracture patients experiencing delirium, dementia and dementia. This should include knowledge about assessment tools; delirium management; care and communication with patients with cognitive impairment; behavioral symptom management.

Functional Recovery (Rehabilitation)

The return to functional recovery for hip fracture involves a multidisciplinary approach that starts on admission of the patient to the emergency department and continues through assessment and treatment and, focuses on returning the patient to their home throughout their care. This approach will increase the likelihood that patients are able to return to their pre-fracture functional status and living environment. This treatment approach needs to include increasing ambulation tolerance as well as assessment and treatment to improve activities of daily living. Ongoing assessment is critical for care transition planning. The following sections are included in this document to provide a context for promoting functional recovery:

- Acute management
- Sub acute management
- Post acute management

Acute care Management

(Day 0 – 7 postoperative)

The initial functional recovery strategy through day 1 – 7 is covered in the Immediate Postoperative section.

Sub-acute Recovery

(5 days postoperatively up to 90 days postoperatively)

Once a patient becomes medically stable, the focus of care shifts from a medical model of care to a functional model of care. As the hip fracture continues to heal, care is now primarily aimed at improving the patient's independence in self-care, transfers, and ambulation to allow them to return to their pre-fracture living arrangement.

This may involve transition to rehabilitation settings (e.g. rehabilitation wards, free-standing rehabilitation facilities); discharge home with appropriate medical, rehabilitation and social supports; or, continuation of care in the same setting with a focus on improving functional independence. The key to the success of the patient's recovery is the opportunity for ongoing intensive rehabilitation which can take place in different settings dependent on the resources.

Examples of appropriate care settings include:

In-patient Rehabilitation – Inpatient rehabilitation may be offered for varying lengths of time to patients who are not yet ready to return to their home environment. This form of rehabilitation may occur in freestanding facilities or in hospital wards that offer lower acuity care with a focus on rehabilitation rather than medical management (i.e. Geriatric Orthopaedic Rehabilitation Units).

Community-Based Care – Where extensive home care services are available, recovery at home should be considered a viable option for sub-acute rehabilitation. Careful assessment of a patient's medical, rehabilitative and social needs should be considered in determining if this option is appropriate and encouraged where possible.

Supportive Living Environments – Careful assessment of patients who were living in supportive living environments prior to their hip fracture (e.g. those living in lodges, daily assisted living environments, nursing homes, etc.) should be considered to determine if patients are able to return to a similar level of care.

- › Services (medical, rehabilitative) can vary widely among these settings; thus standardized transition planning should be used to ensure that all facets of patient care are considered prior to the patient returning to the facility. This includes access to a medical specialty to oversee the complex medication issues for these patients including cognitive enhancers as well as fracture prevention strategies.

- › For a few patients there may be the need to complete tests or to readmit patients to the acute care units for specific treatments. Wherever possible these processes should be pre-planned through hospital agreements or arrangements prior to transfer to prevent patients going through the emergency room.
- › Caregivers from these facilities should play a role in care transition planning by being provided with all relevant information to avoid preventable re-admissions back to the surgical hospital.
- › The patient should be transferred to the new unit or facility at a time when both facility staff will be able to manage the patient's needs, including providing appropriate levels of functional activity.
- › Consideration should be given to providing augmented treatment to these individuals if local resources are not adequate, including that provided by external resources (e.g. home care).
- › Group exercise programs can be a consideration which provides social stimulus and support in conjunction with the physical care needs of the patient.

Hip fracture patients often have multiple medical issues, including impaired cognition and are frequently de-conditioned, giving them very little reserve for recovery. Effective treatment can be offered in multiple environments depending on patient needs and resource availability, but is integral to promote maximal functional recovery after hip fracture.

Sub-acute active treatment to promote functional recovery (i.e. starting at 5-7 days postoperatively) should be available to all patients who were ambulatory prior to fracture regardless of cognitive/medical status. Those with impaired cognition and/or complex medical/social needs may require longer stays with more prolonged treatment prior to transitioning back to pre-fracture living arrangements.

The intensity and frequency of treatment should be increased within patient tolerance during this sub-acute period of recovery. An activity plan that is focused on the patient's needs in the home environment should be created by the multi-disciplinary team and take place throughout the day. This plan should include:

- › Mobilization
- › Stairs (as necessary)
- › Elimination of trip and slip hazards
- › Activities of daily living

The following elements can be considered to optimize patient care:

- › Use of a clinical pathway to promote standardization of care and continual progression of treatment program.
- › Regular team meetings to discuss patient progress, barriers to discharge and strategies to overcome known barriers
- › Secondary fracture prevention must be a component of sub-acute management including:
 - › Osteoporosis, (see Osteoporosis section)
 - › Fall risk (see Falls section)
- › Nutritional supplementation – High protein diets with vitamin/ mineral (Vitamin D/calcium) supplementation should continue.

Patients will have varying needs and require intensive treatment for varying periods of time; thus assessment of their ability to return home with support to continue recovery should be ongoing throughout this period. Some patients will be ready to return home within 1 to 2 weeks with appropriate home support while others will need to be sent to slower stream care settings that might continue up to three months post-fracture.

Ongoing Functional Recovery in the Community

The focus of functional recovery within the first few months is to promote activity as the fracture site heals. However, even once the fracture has healed patients may be able to increase their physical abilities with ongoing improvements up to one year post surgery. Therefore, when the patient has been discharged, consideration should be given to having patients attend ongoing exercise programs to optimize their conditioning either through community-based exercise programs or within the institution in which they are residing. The following factors should be considered for a program:

- › There is evidence that fall risk can be reduced and physical function improved through programs that involve resistance training and balance work.
- › For maximum recovery, the intensity, duration and frequency needs to be appropriate for the patient's level of function however a multi-week program needs to be considered (six-weeks to three-months).
- › There may be added value to these programs as they offer further opportunities to educate the patient and their family on fall prevention, bone health management and can also provide important social contact for the patient.

Further information is available in the document "Functional Recovery" in the Resource Folder.

Care Transitions

Care transitions are points of exchange or “handoffs” that particularly affect vulnerable people such as those following a hip fracture, who may experience frequent changes in health status and several transitions between and across care settings or care providers. It is during these transitions which occur either across the health care continuum or into the community that these patients have the greatest risk of serious unmet needs, poor satisfaction with care, adverse clinical events, and medication discrepancy issues. The outcome of well considered care transitions are:

- › Health care continuity including prevention strategies
- › Appropriate educations for patients and families
- › Avoidance of preventable poor outcomes, and
- › Safe and timely transfers from one level of care or setting to another.

The following section provides information on:

- › Patients and families: essential members of the care team
- › Guiding principles in successful care transitions
- › Considerations in care transition between organizations
- › Returning home

Patients and Families: Essential Members of the Care Team

Following a hip fracture, patients may transition between a variety of health care settings including: acute care, rehabilitation, home care and long-term residential care. Patients and families are the only continuous link from one setting to another – they are the constant members of the health care team. As such, they play an essential role in care transitions.

In order to increase the patient’s confidence, throughout their hospital stay patients and caregivers should be provided with standardized education, support and coaching on:

- › The hip fracture injury and surgical repair.
- › Their role in recovery: turning, mobilizing, pain management, venous thromboembolism prophylaxis, medication, dementia, delirium, depression and infection prevention.
- › Anxiety reduction strategies for mobilization.

With respect to discharge planning the patient and family should be fully informed at the beginning of the hospital stay about the care plan, including targeted length of hospital stay in acute care, options for rehabilitation, and the focus on returning to the patient to the pre-fracture living situation in the community. This can be completed through an early future care

planning conference. This planning facilitates confidence in patients and families and allows them the opportunity to plan.

Guiding Principles in Successful Care Transitions

The following guiding principles need to be considered in creating a successful care transition process.

- › All members in an inter-professional team have responsibility for effective, efficient and consistent communication and processes that support integration across the healthcare continuum. Professionals include physiotherapists, occupational therapist, social workers, nurses, and physicians as well as community providers.
- › The model of care for the region needs to include all prospective sites where the patients will receive their care. The model of care also establishes the process necessary for transitions to other organizations including the expected length of stay in acute care and rehabilitation so that health professionals follow pre-arranged processes.
- › There needs to be the consideration of the potential for excess disability if a person with dementia is forced to adapt to different environments more often than is absolutely necessary.
- › Inter-professional teams with the patient and family should determine as early as possible the discharge location with a focus on achieving the goals for successful discharge to their previous living situation whenever possible.
- › Risk screening for potential issues upon discharge should be identified early in the process and allow ample time to make preparations for a home supported discharge. For the more complex patients, the re-evaluation of the discharge plans needs to be an ongoing process throughout the patient's hospital stay. Also, for the few patients identified as unable to return to their pre-fracture setting there will be the opportunity to make arrangement for transition to the alternate destination.
- › Home visits completed by a rehabilitation staff member are recommended when questions arise about the patient's safety and ability to function at home and are related either to the home environment or the functional recovery of the patient. For patients that present with cognitive issues this assessment can be very insightful as the patient's functional level may well improve once they return to their more familiar home environment.

Considerations in care transition between organizations

In many regions, following their surgery and acute care medical stay patients are required to move into other units within the same hospital or between organizations. This transition requires a well thought out plan to ensure that the patients are being transferred to a place that can best meet their needs. There are therefore a number of system infrastructure elements that are required within acute care and the functional recovery (rehabilitation) environment that will have an effect on what is required to achieve a successful transition.

There are four broad key messages that are helpful to understand:

1. What a clinician needs to do (or doesn't need to do) as part of this process will depend on the relevant surrounding system and infrastructure elements.
2. Achieving best practices in this regard may depend less on the individual choices made, and more on how these choices fit together.
3. Developing tools, rules, and standards can be very helpful; however, these will not achieve their full potential without investment in the relationships.
4. Achieving good trust and communication can be related to a number of factors that have consistently been shown to help in these situations.

The following factors will affect the patient's transition.

Acute Care:

1. **Discharge planning model:** There are a number of different discharge models including:
 - A. A nurse led discharge planning model in which a nurse on the care team facilitates referral or discharge planning
 - B. A social worker led discharge planning model in which a social worker on the care team for the patient facilitates referral or discharge planning
 - C. A liaison model in which a designated professional within the unit or floor takes responsibility for all discharge planning activities for all patients on the floor
 - D. A multidisciplinary discharge planning model where any or all members of the team are generally involved.
2. **Physical transitions:** Increased planning will be required where patients are moved to an alternate location.

3. **Number of post acute care partners:** A coordinated approach is required where there are multiple partners.
4. **Degree of decision making regarding admission:** The decision to accept the patient will be influenced by the level of decision making authority of the person reviewing the admission documentation.
5. **Describing the patient:** The presentation of the patient information including whether standardized or in a non standard format will influence the final decision.
6. **Using the technologies:** The technologies that are available to assist in the decision making on admission will affect the processes.
7. **Policies and procedures:** Rules, policies and procedures need to be followed.
8. **Trust and communication:** There needs to be a communication system that provides feedback in a timely, accurate way in which the role of each partner is understood and respected and the goal is to meet the needs of patients.

Post Acute Care Settings (in addition to those listed for acute care):

1. **Nature of acute care settings:** There needs to be an understanding of the programming within the acute care sector and the likely medical presentation of the patients.
2. **Getting a picture of the patient:** It is important that appropriate information is provided to admit the patient; however, this need for information should not limit access for hip fracture candidates.
3. **Balancing corporate and patient care needs:** Ensuring that the organization has the ability to meet the patients functional, medical and cognitive needs including on-site services or the ability through partnerships to access tests and/or care through other organizations.
4. **Making the decision to accept the patient:** Ensuring there are processes to streamline the patients transition when the decision is made to accept the patient.

System Supports for Facilitating Admission Decisions

What a clinician will or will not need to do in facilitating the admission decision from acute to post acute care will depend directly on what the system infrastructure looks like around them. This subsection focuses on a number of system initiatives that can help streamline processes in this regard.

Process related issues:

1. **Information:** Information on programs available is required by the sending hospital to ensure that the patients are being transferred to a place where their care needs can be met. This includes clarity on what information is needed about patients, programs, policies and procedures.
2. **Formalization:** Rules, policies, and procedures can help to streamline the process however the system needs to be flexible enough to consider individual patient and program needs. Rules also need to work for both the acute and post acute care sides and there needs to be a commitment to them and a system to identify issues and enforced them if required. These rules can be developed considering the choice of partners or preferred partners and can include guidelines, algorithms and care pathways that can help in the decision making process.
3. **Relationships as coordination mechanisms:** No matter how clear the information is about patients, programs, or procedures the nature of patient transitions will often require case by case problem solving between the acute care and post acute care settings. While some may attribute this to personalities, the literature has identified at least 7 factors that can be manipulated to consistently achieve relationships that enable effective coordination. These include (1) shared goals between the senders and receivers, (2) a clear understanding of roles of each of the sending organization and receiving organization's staff in this process (3) joint problem solving (4) mutual respect (5) accurate communications (6) timely communications and (7) frequent communications.
4. **Communication modalities:** There has been a proliferation of innovations and technologies that have been designed to streamline and facilitate the referral process. These can be very helpful, however, available evidence would suggest that a mix of communication modalities remains more effective than reliance on only one, there may not be any effect on efficiency, and relationships will remain a determining factor in achieving success through whichever medium is selected.

Capacity related issues:

While there is often much that can be achieved through system re-design and quality/efficiency-related considerations, at some point capacity issues may become especially important and relevant in the discussion.

As examples, the following have been identified by patient flow experts across the country, as the most common themes to go beyond process redesign and achieve the next level of excellence in patient flow.

- › Access to care in the community
- › Appropriate bed and staffing capacity in all relevant settings

- › Physical space and infrastructure needs
- › Health information technology
- › Data and evidence to guide decision-making
- › Alignment of incentives between various providers and settings

Current evidence on care transitions between organizations has emphasized the need for clear communication between facilities and among disciplines. Strategies to improve care transitions can include the use of:

- A. Clear admission criteria which allow patient early access to the appropriate care unit
- B. Standardized discharge summaries to ensure complete information on patient's medical (including osteoporosis, fracture risk, medications), rehabilitative, and cognitive progression, during the hospital stay and current status at time of discharge.
- C. Provision of information on patient's pre-fracture status (function, cognition, medical) as well as the pre-fracture living environment and social/ caregiver support.
- D. A case manager who acts as a conduit among health care providers as well as with the patient and their family
- E. Consultation with patient and family about reducing risk of fracture: falls prevention, lifestyle modifications, adherence to medication

Further information is available in the document "Care transitions" in the Resource Folder.

Returning Home

The Model of Care for hip fracture patients has been designed to focus patient care through the continuum of care with the goal of discharging patients to their pre-living arrangements. For many patients they may have to function at home independently. Patients and families can feel fearful and uncertain heading home. As such, it is important that they are as prepared as possible to manage issues that may occur.

There is often immediate concern about the injury, surgery and recovery as well as concerns over loss of independence and the resources to care for the injured person after discharge. Psychological support and education reduce anxiety and enable the patient and family to plan appropriately for the future. Developing self-care capacity to improve confidence and competence will help patients manage care transitions and have confidence in their independent abilities as they progress through the system. There are a number of established self-care tools available that reduce anxiety with mobilization; support understanding of the hip fracture surgery and hospitalization; establish the patient's role in preventing, detecting and manag-

ing complications; as well as preparing the home with necessary supports. The following are important considerations to prepare a patient for their return home:

Medical Appointments: Consultation and medical appointments managed within the primary care sector and through outpatient clinic specialists' appointments need to be considered and set up where possible prior to discharge.

Programs: Prior to a patient's discharge from hospital, services need to be coordinated in the community. Sufficient notice must be given to allow patients and caregivers time to make arrangements and setup the care for the patients return home.

In situations of identified or potential dementia, referrals for geriatric services should be considered including:

- › Geriatric/geriatric psychiatry or memory clinic assessment/follow-up
- › Alzheimer Society for patient/ family caregiver support
- › Supported care environment/retirement home/day programs appropriate for the individual.

Education: For a successful discharge the following pieces of information are essential to prepare patients and caregiver/families for their transition home

- › Signs of Serious Problems: When to Call an Ambulance

When people leave the hospital with health problems they may get into difficulty at home. This can be stressful and confusing. Knowing the early signs and what steps to take is important so that the right things happen quickly. Patients and families need to understand when a symptom is serious.

- › Managing Pain

It is important to explain to patients and families how to manage pain. Patient and families should be told that there may be pain around the area of the surgery. The tissues and muscles around the surgical site may have become inflamed and weak from the surgery and that the inflammation and pain will get better with time.

- › Home Support/Homecare

Patients and families need to give thought to what they will need to manage safely at home. Home care services may be private (paid by patient/family), paid by a private insurance com-

pany, such as Veterans affairs or subsidized by the government, meaning the patient/family may be asked to pay in part, based on what they can afford.

If patients/family are concerned about their ability to pay for the required services they need, ask them to speak to the hospital social worker.

Fall Prevention

Given that 95 % of hip fractures are due to a fall, preventing falls is an obvious solution to preventing hip fractures. For an older person who sustains a hip fracture fall prevention strategies should be put in place during the hospital stay and after discharge to reduce the risk of future falls and a possible subsequent hip fracture.

Falls occur due to a loss of balance and the inability to recover balance. However, the factors that contribute to a loss of balance are complex and compounding. Leading risk factors significantly associated with falls in acute care settings include.

- › gait and balance instability
- › agitated confusion
- › urinary incontinence/frequency
- › falls history
- › prescription of drugs, especially sedative/hypnotics
- › unmet care needs (e.g., toileting)

Most falls in acute care settings are found to occur at night and are related to toileting.

Effective prevention strategies are those that tailor prevention to identified risk factors, are delivered by trained healthcare providers, and integrated into the lives and goals of the older person at risk. The following are recommended strategies for the reduction of fall and fracture risk among older adults:

- › **Physical Activity:** Either pre or post surgery long periods of bed rest result in diminished muscle mass and bone density leading to higher risk for falls and fractures. To reduce fall risk, patients need to mobilize as soon as possible after surgery and throughout their hospital stay. However, it is important to remember that 2-3 days of bed rest for older adults results in significant muscle loss and reduced bone density, highlighting the need for assistance in mobilizing safely until strength is re-gained. Following discharge, an exercise program that focuses on balance and strength should be put in place with consultation from a physical therapist to safely increase mobility within the home and outdoors. Tai Chi exercises are an example of a proven strategy for reducing fall among older adults.

- › **Medications:** Use of medication while in the hospital and after discharge can include those that increase the risk of falling due to: drowsiness, dizziness, hypotension, Parkinsonian effects, ataxia/gait disturbance, or vision disturbance. Medications that include one or more of these side effects include antidepressants, antipsychotics, anti-convulsants, muscle relaxants, opiates/narcotics, sedatives, anti-nauseants and benzodiazepines. These need to be minimized in number, dose and duration, and come with warnings about the nature of the increased risk for falls. To enhance muscle and bone strength, Vitamin D supplements of 800-2000 IU per day are recommended. Most older adults benefit from the higher range.
- › **Built Environment:** There are many issues related to fall risk for older adults in all settings of the hospital (emergency department, acute floors and rehabilitation areas). These include the lack of access to safe walking routes, lack of handrails, slippery floors, high beds, trip hazards, etc. A building audit should be conducted for potential fall hazards that can be modified. Prior to discharge, a referral to an occupational therapist is recommended for a home assessment and environmental modification to eliminate fall hazards.
- › **Mobility Aids and Equipment:** Walkers, canes and other mobility aids should be assessed for appropriateness and adjusted for fit by a physical therapist. Hip protectors are a proven strategy for the prevention of future hip fractures if the hip protectors are properly fitted and tested for their ability to prevent a fracture. Two brands that meet the latter specification are Hip Saver™ and Safe Hip™.
- › **Fear of Falling:** For older persons who have had a fall or near fall, the fear of falling again is a very real phenomenon. This fear often leads to restricted activity and altered gait that puts the person at even greater risk for future falls and injuries. To address the fear of falling among patients in hospital and after discharge, health care providers should talk with their patients about their concerns and how they can be addressed. This can be done through the use of the Falls Efficacy Scale-International (FES-I, short or long version). The total score indicates the degree of the fear of falling with individual scale items flagging areas where support is needed to overcome the fear and to promote safe mobility and independence.
- › **Staff Education:** Training for healthcare providers on evidence-based fall prevention is available across Canada in workshop and e-learning versions through the Canadian Falls Prevention Curriculum (for more information see: www.injuryresearch.bc.ca or <http://www.uvcs.uvic.ca/health/courses/professionals/>) A newly released multimedia fall prevention training program for physicians is available at: www.pspbc.ca or www.seniorsbc.ca.
- › **Reporting:** All falls that occur in hospital need to be recorded with details on the time, location, contributing factors, nature of any injury and recommended strategies to

prevent future falls. This should not be limited to witnessed falls. If a patient is found on the ground or seen to be bruised or injured, they should be asked to describe what happened. Data collected on all falls will show patterns that will assist facility-wide prevention planning as well as individual prevention strategies. Fall prevention planning is now a Required Operating Practice (ROP) by the Canadian Accreditation Standards that includes a team approach for fall risk assessment, tailored prevention strategies and ongoing evaluation. Implementing such a program requires leadership, staff training, use of validated assessment tools, and knowledge of proven prevention strategies.

- › **Syncope:** assessment of falls should include evaluation for possible syncope. If syncope is suspected then appropriate evaluation and interventions should be undertaken
- › **Discharge Planning:** A fall and fracture prevention plan should be in place well before discharge based on a patient/family consultation, with a multidisciplinary team of healthcare providers, and include a mobility assessment and home safety assessment. Educational handouts for patients and family members on basic fall prevention tips are available at <http://www.phac-aspc.gc.ca/seniors-aines/publications/public/injury-blessure/falls-chutes/index-eng.php>. Fall prevention programs exist in all provinces, and include fall prevention clinics for in-depth assessment and follow up. A description of these programs can be found at www.injuryresearch.bc.ca in the PHAC report titled “Falls and Related Injuries among Older Canadians: Fall-related Hospitalizations & Prevention Initiatives.”

Evaluation

Health organizations identify and measure Key Performance Indicators (KPIs) as a method to compare performance, set targets and promote improvements in the quality of care. This allows healthcare providers, administrators and decision makers to monitor performance and enhances their ability to effectively target areas for change. Performance of healthcare is multidimensional and especially for hip fracture patients who may move between a number of sectors prior to discharge including emergency care, surgery, acute care and potentially rehabilitation. A systems approach therefore needs to be considered with KPIs for this patient population with consideration of a diverse variety of KPIs that address outcomes from both clinical and administrative perspectives.

An evaluation framework of KPIs was identified and recommends KPIs that would assess and guide improvements after the implementation of the Toolkit for primary hip and knee replacement surgery. The foundation for the development of the evaluation framework required KPIs to be quantifiable and critical to the goal of addressing care for hip fracture patients.

Identification of Key Performance Indicators

In making decisions about the KPIs for the Toolkit the Dimensions of Quality within the Alberta Quality Matrix of Health [<http://www.hqca.ca>] has been used as the framework for the recommended KPIs. The potential usefulness of the data at a local, provincial and national level as well as the availability of the data, has also been taken into consideration in the development of the list of KPIs. The KPIs recommendations provide an overview of those indicators considered necessary in the management of a comprehensive program for this patient population and are marked in blue on the chart as well as those, while important, are not as critical to an evaluation framework.

Table 1: Alberta Quality Domains for Health

Quality Domain	Definition
Acceptability	Health Services are respectful and responsive to user needs, preferences and expectations
Accessibility	Health Services are obtained in the most suitable setting in a reasonable time and distance
Appropriateness	Health Services are relevant to user needs and are based on accepted or evidence-based practices
Effectiveness	Health Services are provided based on scientific knowledge to achieve desired outcomes
Efficiency	Resources are optimally used in achieving desired outcomes
Safety	Mitigate risks to avoid unintended or harmful results

Canadian Joint Replacement Registry (CJRR)

Where patients have undergone a hip replacement to repair their fracture the data needs to be entered into the CJRR to ensure relevant information is captured on the surgery and prosthesis.

HQCA Domain	Indicator	Information/ Target	Importance (Must have/nice to have)	Method for measurement	Data available nationally and source	Patient sample	Reporting Scope	Frequency of reports
Pre surgery								
Background	Demographics	age gender SES Income and education, fracture type, side, OP	Patient analysis	Electronic	CIHI DAD	All patients	Local	As needed
Background	Place of residence, community dwelling/LTC		Patient analysis	Electronic	CIHI DAD	All patients	Provincial	As needed
Background	Comorbidities including cognition		Patient analysis	Electronic	CIHI DAD	All patients	Provincial	As needed
Acceptability	Pre fracture function		Patient analysis	Patient Questionnaire			Local	As needed
Accessibility	Time in emergency room		nice to have	Electronic		All patients	Local	Quarterly
Accessibility	Percentage of patients waiting <24 hours from admission to surgery	Data definitions issue with CIHI	nice to have	Electronic	CIHI DAD	All patients	National	Quarterly
Accessibility	Percentage of patients waiting <48 hours from admission to any hospital to surgery	Target 48 hours Data definitions issue with CIHI	must have	Electronic	CIHI DAD	All patients	National	Quarterly
Accessibility	percentage of patients <48 hours within same hospital to surgery	Target 48 hours Data definitions issue with CIHI	must have	Electronic	CIHI DAD	All patients	National	Quarterly
Accessibility	Percentage of patients waiting <48 hours from fracture to surgery	Data unavailable at this time	must have	Electronic				

Accessibility / appropriateness	Reason for delay to surgery	local system analysis	nice to have	Electronic / Other		All patients	Provincial	Quarterly
Effectiveness	Patient Self Efficacy		Patient analysis	Patient Questionnaire		Random / Cross sectional	Local	As needed
Efficiency/ Acceptability	Compliance with Care Path	local system analysis	nice to have	Electronic / Other		Random / Cross sectional	Local	As needed
Surgery								
Background	Surgery type performed	understand surgery trends	nice to have	unavailable currently		All patients	National	Annually
Efficiency	Total OR time		nice to have	Electronic		All patients	National	Quarterly
Safety	Intraoperative adverse events	data unavailable	must have	Electronic	CIHI DAD	All patients	National	Annually
Post operative acute care								
Access	Osteoporosis treatment started in acute care (also see patient outcomes)	100%	nice to have	Manual		All patients	Regional	Annually
Effectiveness	Percentage "weight bearing as tolerated" ordered post surgery	90%	must have	Manual		All patients	Regional	Quarterly
Effectiveness	Discharge disposition of patients directly from acute care	10% home, 20% LTC, 65% patients of total patients receive rehab	must have	Electronic	CIHI DAD	All patients	Regional	Quarterly
Efficiency	Sub-acute/step down care length of stay		nice to have	Electronic		All patients	Regional	Quarterly
Efficiency	Acute care length of stay	5 days: D/C home, LTC, rehab setting	must have	Electronic	CIHI DAD	All patients	National	Quarterly
Efficiency	Acute care length of stay if patients receive all care in acute care	Total 28 days inpatient care						
Efficiency	Alternate level of care designation (if used as a provincial measure)	10%	must have	Electronic	CIHI DAD or local system	All patients	Regional	Quarterly

Efficiency / Acceptability	Compliance with care path		nice to have	Electronic / manual	Medical records	Random / Cross sectional	Local	As needed
Efficiency / Acceptability	percentage of patients mobilized on day 1 (out of bed with assistance)	100%	must have	Manual	Medical records	All patients	local	Quarterly
Safety	Adverse events < 30 days post discharge: pressure sores, inclusive, infection, fall, delirium	readmission to emergency or hospital for treatment	must have	Electronic	CIHI DAD	All patients	Regional	Annually
Rehabilitation								
Accessibility	admission function - physical and cognitive	FIM score or other	must have	Electronic or manual	CIHI NRS	All patients	Provincial	Quarterly
Effectiveness	discharge function - physical and cognitive	FIM change score and/or efficiency	must have	Electronic or manual	CIHI NRS	All patients	Provincial	Quarterly
Effectiveness	Osteoporosis treatment started in rehab (also see patient outcomes)	100%	nice to have	Electronic or manual		All patients	Local	As needed
Effectiveness	Patient discharged destination	75% returning to previous living environment	must have	Electronic/manual	CIHI NRS where available	All patients	National	Quarterly
Efficiency	Rehabilitation length of stay	28 days	must have	Electronic	CIHI NRS	All patients	National	Quarterly
Efficiency / Acceptability	Compliance with care path		nice - local	Electronic / manual		Random / Cross sectional	Local	As needed
Safety	Adverse events < 30 days post surgery	Data unavailable at this time	must have	Electronic		All patients	Regional	Annually
Safety	Readmission to acute care < 30 days post surgery for rehab without NRS	No target	must have		CIHI DAD	All patients	Regional	Annually

Safety	Readmission to acute care <30 days post surgery from rehab with NRS	Service interruptions no target	must have	Electronic	CIHI NRS	All patients	Regional	Annually
Patient outcomes								
Acceptability	Patient satisfaction		nice to have	Patient Questionnaire		Random / Cross sectional	Local	As needed
Effectiveness	In hospital mortality	5%	must have	Electronic	CIHI DAD	All patients	National	Annually
Effectiveness	Mortality at 1 year		must have	Electronic	CIHI DAD	All patients	National	Annually
Effectiveness	Variance to discharge from pre living		must have	Electronic	CIHI DAD and/or NRS	All patients	National	Quarterly
Effectiveness	Admissions to LTC in 6 months		must have	Electronic	RAI or other	All patients	National	Quarterly
Effectiveness	Osteoporosis treatment started	100%	must have	Electronic	Ontario Drug benefits/ Alberta/ BC	All patients	Local	As needed
Effectiveness	Refracture rate 1 year post surgery		nice to have	Electronic	CIHI DAD	All patients	National	Annually
Effectiveness	Patient reported outcomes (function/pain improvement from pre-surgery)		must have	Patient questionnaire		All patients	Local	Annually

